Rock Products

and CEMENT and ENGINEERING NEWS (Est. 1896)

THE OLDEST PUBLICATION IN ITS FIELD AND THE RECOGNIZED AUTHORITY

Listen to the Voice of Firestone — featuring Margaret Speaks, Soprano, with the Firestone Choral Symphony, and William Daly's Orchestra— every Monday night over N. B. C. Nationwide Network

HOW GROUND GRIP TIRES REDUCE YOUR OPERATING COSTS AND GIVE YOU THE GREATEST TRACTION EVER KNOWN . . .

HERE is the tire that will take your equipment through any kind of going, over any unimproved roads, in any weather. It gives you greatest traction ever known, and you do not need chains, even in mud or snow.

Firestone patented construction features make it possible for Firestone to build this tire. The body is built with Gum-Dipped High Stretch cords. Gum-Dipping is a Firestone patented construction feature which soaks and coats every strand of every cotton cord with pure liquid rubber. This makes the body of the tire stronger to withstand the stresses and strains of the extra pulling power of the Ground Grip Tire.

The massive super-traction tread is locked to the cord body by two extra layers of Gum-Dipped cords under the tread (patented).

The tread is scientifically designed so that it is not only self-cleaning, but it does not bump when used on paved roads.

See your nearest Firestone Auto Supply and Service Store or Firestone Tire Dealer. Start reducing your operating costs today.

GROUND GRIP *Gum-Dipped*	
6.00-20	$16.95
6.50-20	21.95
7.00-20	29.10
7.50-20	35.20
7.50-24	39.00
8.25-20	49.30
32x6 TRUCK TYPE	27.65
32x6 H. D.	36.25

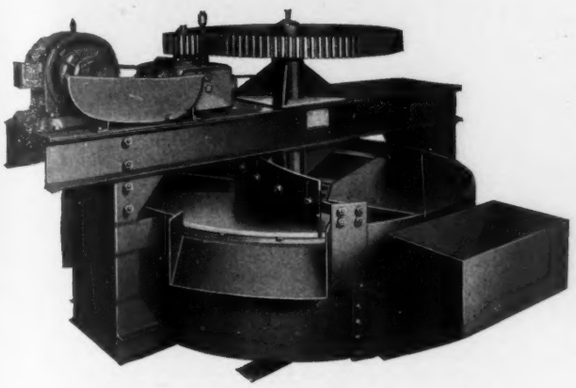
Other Sizes Proportionately Low

Firestone
GROUND GRIP TIRES

Sand

THAT MEETS THE NEWER SPECIFICATIONS -- PRODUCED WITH THE

Rotoscoop



THE trend is towards cleaner, more uniform sand, of greater fineness—some specifications being written today, require from 10 to 25% of 50-mesh, and 2 to 15% of 100-mesh sand.

The Link-Belt Rotoscoop provides a simple method of recovering fine grains formerly lost in the overflow water —discharging dry enough for truck transportation.

The volume of fines and grading can be easily varied to suit requirements.

The Rotoscoop is a self-contained unit requiring low headroom, and minimum space and foundations; also little power. Can be fitted-in to take the overflow from present sand units, or to replace them. Send for Folder No. 1463.

5472

LINK-BELT COMPANY

The Leading Manufacturer
of Equipment for Handling Materials and Transmitting Power

CHICAGO PHILADELPHIA INDIANAPOLIS
ATLANTA SAN FRANCISCO TORONTO

Offices in Principal Cities

The Rotoscoop is made in four sizes: 15 ft., 12 ft., 9 ft., and 6 ft. diameters, with capacities ranging from 20 to 150 tons an hour, based on material weighing 100 lbs. per cu. ft.

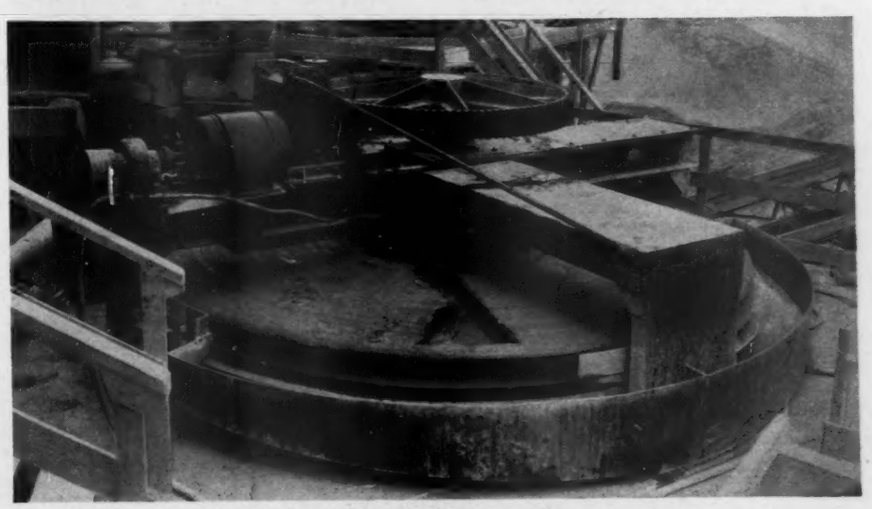
Link-Belt makes a complete line of sand dewatering devices, including screw and log washers, conical separators, dewatering flight conveyors, and the Shaw classifier. Link-Belt engineers will be glad to look into your operating conditions and recommend the right unit for your work.

•

The illustration to the right is of a 15 ft. diam. Link-Belt Dewatering Rotoscoop handling crushed limestone sand at Norris Dam (T.V.A.), Norris, Tenn.

Another user has recently written, "We are proud of the Rotoscoop; our sand has been running 18% passing a 50-mesh screen — we figured the deposit would run from 12 to 15% passing."

LINK-BELT



Rock Products

With which is Incorporated **CEMENT and ENGINEERING NEWS** Founded 1896

Entered as second-class matter, Jan. 15, 1935, at the Chicago, Ill., postoffice under the Act of March 3, 1879.
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(Published Monthly—Except January, Semi-Monthly)

November, 1935

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(Rock Products is indexed in the "Industrial Arts Index," which can be found in any Public Library)

Telephone Harrison 1422-23

TRADEPRESS PUBLISHING CORPORATION
330 South Wells Street, Chicago, Illinois, U. S. A.

Telephone Harrison 1422-23

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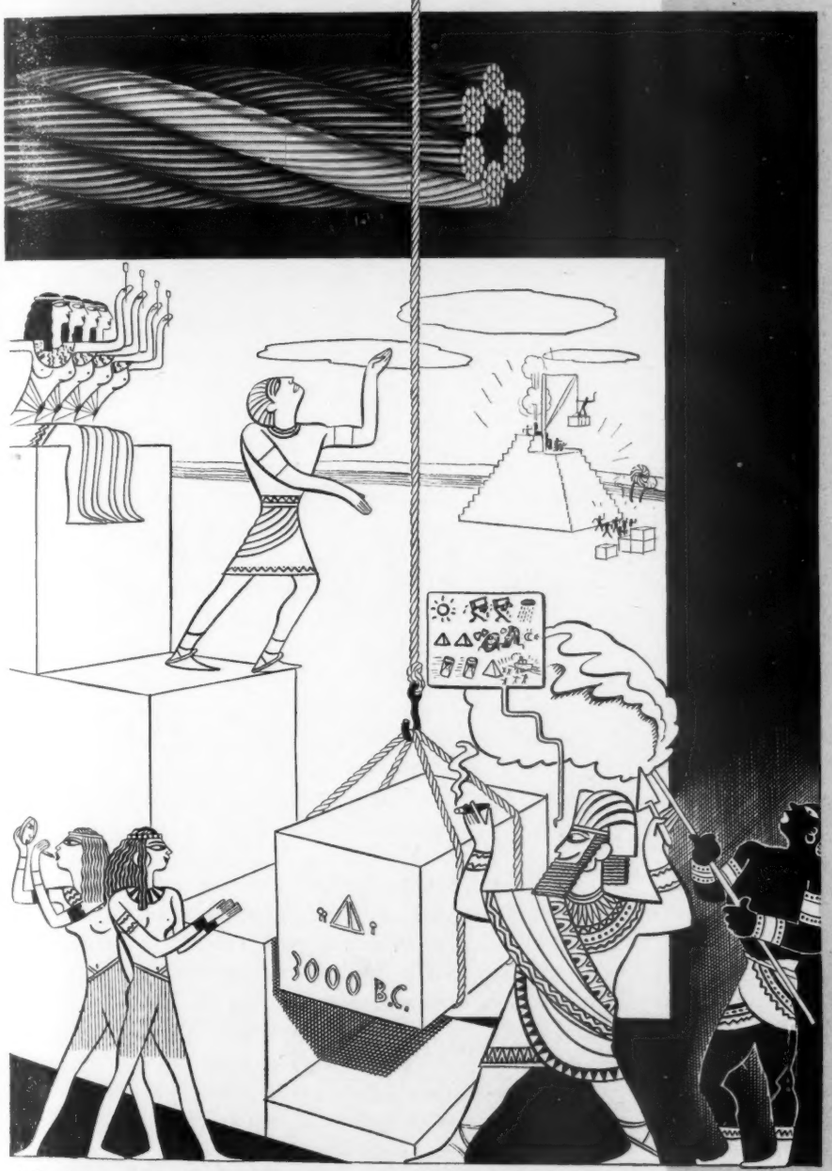
How much easier the Pyramids would have been to build . . . with

MONARCH WHYTE STRAND*



AD NO. 174

NO JOB TOO TOUGH FOR THIS TRIPLE-FEATURE WIRE ROPE, SAY EXCAVATING ENGINEERS

● Whenever digging operations demand a wire rope that combines super-strength with maximum dependability . . . engineers are specifying Monarch Whyte Strand. Three special features are giving this rope the stamina to set unusual service records . . .

1. Careful heat treating and drawing of each individual wire in the strand assures long life.

2. Internal lubrication . . . a special kind that is not affected by heat, cold or ordinary acids . . . protects each wire in the strand against internal corrosion and internal friction.

3. PREFORMED construction withstands bending with minimum of strain . . . service is increased.

DISTRIBUTORS: Monarch Whyte Strand Wire Ropes, especially designed for your use, are carried in stock by many distributors who can give you excellent service. Write for location of stock nearest you.

FREE . . . "Information Helpful in Specifying Wire Rope." Write today for this interesting, practical folder.

MACWHYTE COMPANY
KENOSHA, WISCONSIN

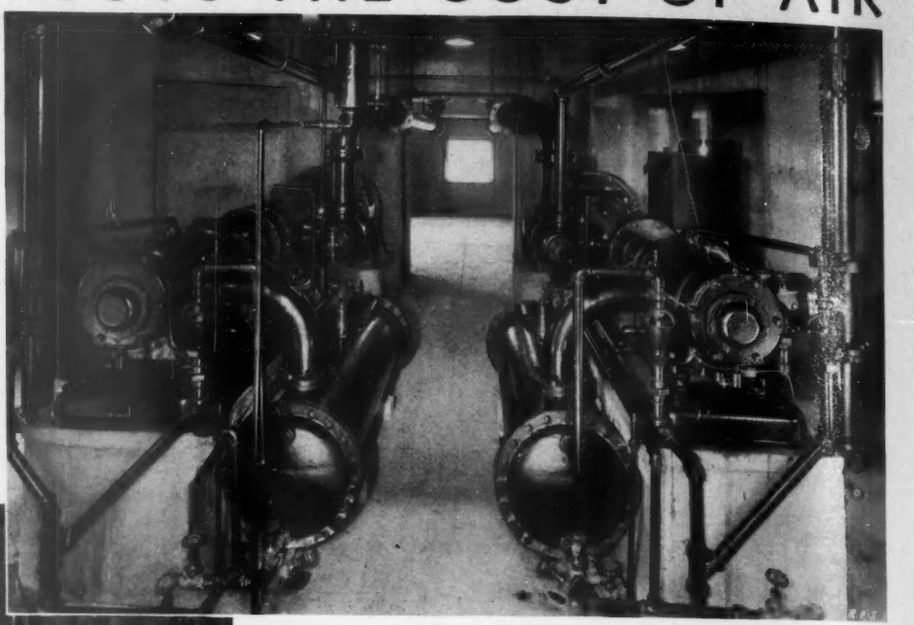
* Civil engineers estimate that with modern machines and equipment the Great Pyramid of Gizeh could be reproduced in 2 years time! Actually, the most reliable sources indicate that 100,000 slaves labored over a 10-year period to quarry the stone—and 5,000 more men worked for 20 years to finish these stones and lift them in place.

Special Constructions for Digging Operations

Macwhyte manufactures special wire ropes for shovels, drag line excavators, slack line excavators, quarry derricks, digging and bucket hoist lines, clamshell cranes, and special Hi-Lastic lines for blast-hole and water well drilling.

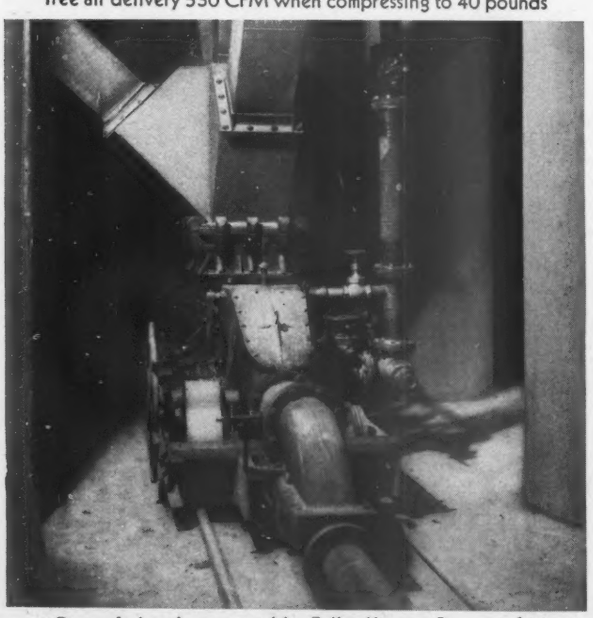
MONARCH WHYTE STRAND PREFORMED and Internally Lubricated Wire Rope

NATIONAL PORTLAND CUTS THE COST OF AIR



One of these two-stage compressors serves a pneumatic conveyor. The other furnishes air for slurry agitation. Each has an actual delivery of 800 CFM and is compressing to 75 pounds. A small two-stage machine at the quarry supplies air to 100 pounds.

One of the three single-stage compressors which supply the Fuller-Kinyon Cement Pumps and the pack-house. Actual free air delivery 530 CFM when compressing to 40 pounds



One of the three portable Fuller-Kinyon Pumps which transport cement from the storage silos to the pack-house.

PROPER SELECTION OF UNITS FOR EACH DUTY

There are six separate Fuller Rotary Compressor installations. Each is designed to satisfy separate demands for volumes and pressures. There is no excessive idling time—no necessity to operate a large machine at poor power efficiencies, to meet a small demand when some of the consuming units are idle—no high main supply pressure reductions for low pressure uses, with the losses of the disproportionate power consumption required for high pressures. Line losses are negligible, for there are no long transmission lines.

Fuller Rotary Compressors are particularly well adapted to meet every requirement for such unit installations. Large capacities with relation to size permit installation where space is too limited for other types. Operation is vibrationless and the air flow is free from pulsations. They can be located in dusty rooms, as the drive is direct and all working parts are enclosed. In many plants they have proved their reliability in long, continuous service under the severe conditions of cement mill operation. Write for our bulletin C-3A, for preliminary information on these interesting machines.

Fuller Company
CATASAUQUA, PENNA., U. S. A.

Chicago: 1118 Marquette Bldg.
San Francisco: 564 Market Street

STURTEVANT

***THIS** air separator*
separates to any fineness from 30 mesh to the micron sizes

***THIS** air separator*
increases mill capacities 25 to 40% and delivers an uncannily perfect product

Follow the "LEADER": you will find it predominating in all industries

because of its dependable products—Its larger capacities—The low power cost per ton of material handled—Its freeness from repair costs.

Ask us what this separator will do for you. How it will increase your pulverizer capacities.

To answer these questions we will want to know: Material to be separated. Fineness of wanted product. Percentage of this fineness in the feed to separator. Tonnage wanted in finished product. Kind and size of pulverizer to be used with separator.

STURTEVANT MILL CO. HARRISON SQUARE BOSTON, MASS.

KOEHRING

The Koehring Chain Crowd

KOEHRING HEAVY DUTY

THE KOEHRING CHAIN CROWD

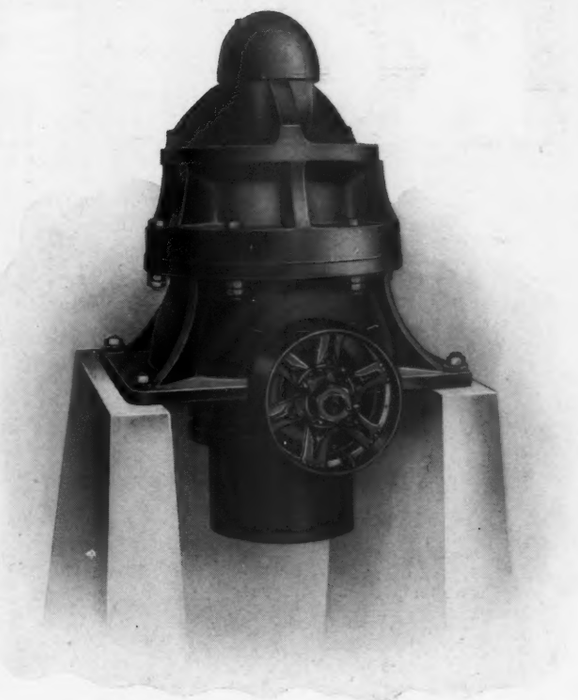
— is a single continuous chain traveling *inside* of the high strength welded boom. The boom can be quickly and easily raised or lowered without manual adjustments or affecting the crowding effort. The chain tension is automatically maintained regardless of boom movement.

KOEHRING COMPANY

Pavers · Mixers · Shovels · Cranes · Draglines · Dumptors · Mud-Jacks

3026 WEST CONCORDIA AVENUE, MILWAUKEE, WISCONSIN

performance proves the pre-eminence of the



TRAYLOR TYPE TY REDUCTION CRUSHER

Traylor Crushers have functioned to the satisfaction of thousands of users during the past thirty-odd years, but in that time there has been nothing like the appreciation that users have voiced about the results secured with our new Type TY Reduction Crusher.

Barely a year old, this daring departure from "grand-dad's" ideas "took hold" at once and is today the most-in-demand finishing machine. Built with—cast steel frame; spider, hopper and top shell in one piece; roller bearings; Traylor Original, Patented Bell Heads and Curved Concaves; positive and automatic lubrication; all-around bottom discharge—the TY is the simplest, strongest, most economical crusher you can buy.

You need this crusher to keep pace with the other fellow—you'll LOSE if you don't USE Traylor—so be sure to send for our brand new Bulletin No. 112, now, before it slips your mind!

TRAYLOR ENGINEERING & MANUFACTURING CO.
ALLENTOWN, PENNSYLVANIA, U.S.A.

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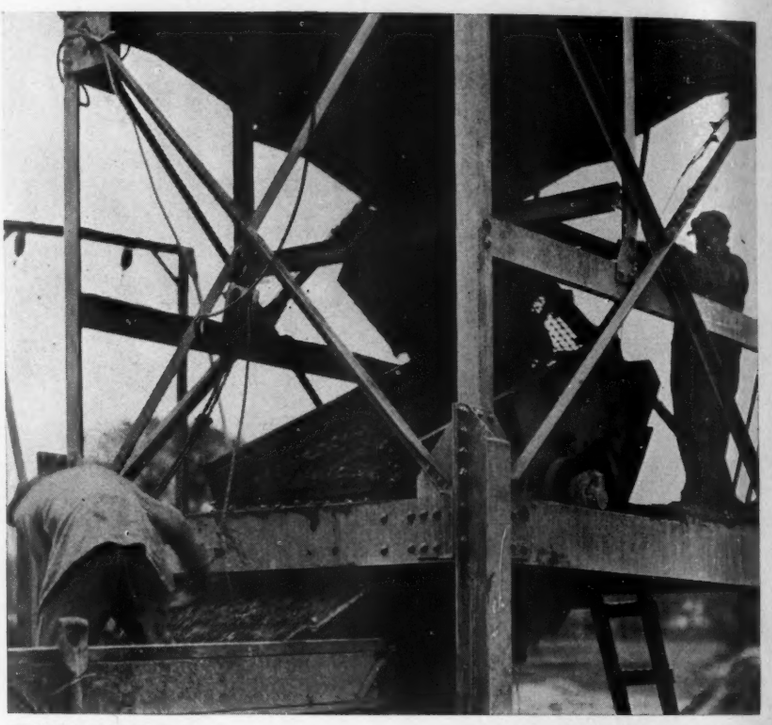
SKF *Bearings*

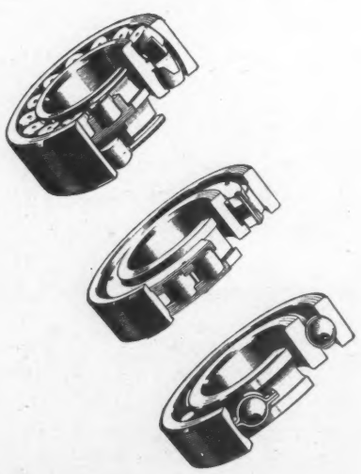
CARRY VARYING LOADS

On Double Deck Vibrating Screens

● SKF makes practically *all types of anti-friction bearings.* When SKF recommends a particular type of bearing, therefore, you may depend upon it; its recommendations are *unbiased!*



SKF-EQUIPPED BUILT BY LINK-BELT CO.



The Link-Belt "PD" Heavy Duty Vibrating Screen has four SKF Bearings in the vibrator unit, mounted in dust-proof housings, which carry the screen and material. The two inner SKF Bearings are mounted on an eccentric portion of the shaft that provides a total screen throw from ⅛" to ½" with proper shaft speeds.

It's heavy jobs like screening sand that demand a bearing to carry varying loads, to meet shocks and vibration, to compensate instantly and automatically for any shaft deflection. Such a bearing is the SKF Spherical Roller Bearing, the logical choice of Link-Belt and other leading screen manufacturers in all parts of the world.

SKF

BALL AND ROLLER BEARINGS 3485

SKF INDUSTRIES, INC., FRONT ST. & ERIE AVE., PHILA., PA.

2,500,000 Yards to move - at a profit

"Our Engineers Were Unanimous in Their Choice of LIMA Shovels to Do the Work"

— ARTHUR A. JOHNSON

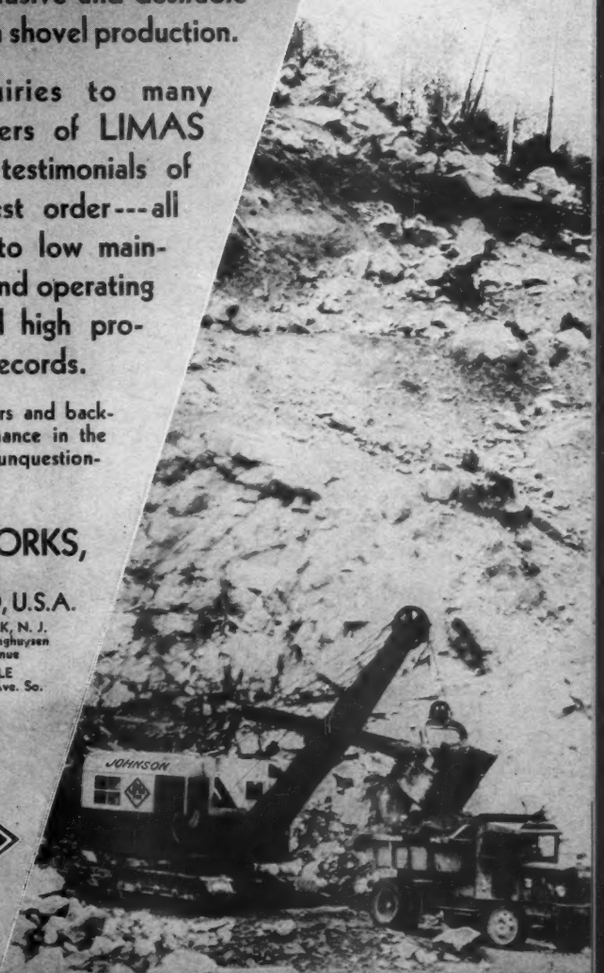
And below we list the principal reasons why Arthur A. Johnson Corporation, of New York and Enfield, Mass., bought three Type 701 LIMA shovels for the first section of the Quabbin Dike job at Enfield, Mass., involving 2,500,000 yards of excavation.

1. An impartial study and comparison of every essential detail in design and construction of five prominent shovels scored an overwhelming number of points in favor of LIMA.

2. A survey of the various factories by Johnson's mechanical department revealed LIMA to have exceptional facilities and shop practices, common to locomotive production, which enabled the incorporation of many exclusive and desirable features in shovel production.

3. Inquiries to many owners of LIMAS brought testimonials of the highest order---all pointing to low maintenance and operating costs and high production records.

Meeting the rigid specifications of careful buyers and backing the judgment of these buyers by performance in the field everywhere, is responsible for LIMA'S unquestionable leadership today.



LIMA LOCOMOTIVE WORKS,
INCORPORATED
Shovel and Crane Division LIMA, OHIO, U.S.A.

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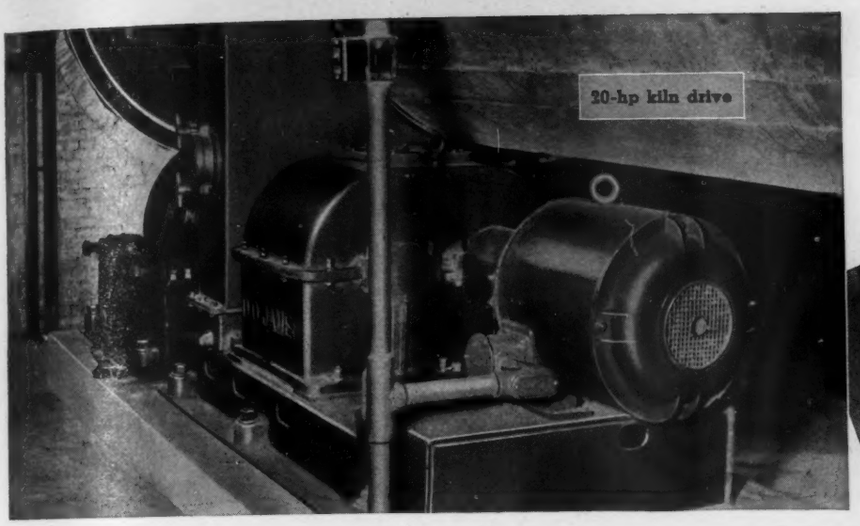
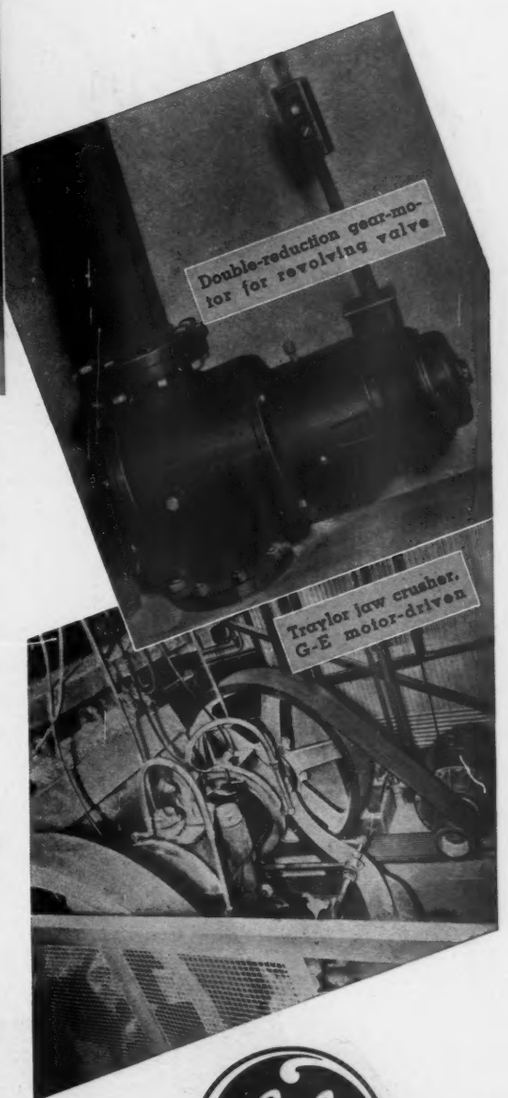
DALLAS 1304 McKinney Ave.
MEMPHIS 77 McCall St.
SEATTLE 2244 First Ave. So.

LIMA

LIMAS ARE BUILT IN CAPACITIES FROM 3/4 TO 3 YARDS

COSTS WITH COMPLETE G-E INSTALLATION





THE rock-products plant of the Minnesota Mining and Milling Company at Wausau, Wisconsin, is an excellent example of the low-cost operation that may be obtained by careful selection of equipment. In this plant, quarry-sized quartzite rock is reduced and processed to provide colored granules for use in the roofing industry. The electric installation, which is G-E throughout, includes transformers that reduce transmission voltages to the required values, with resulting savings through their high efficiencies; switchgear which protects equipment and preserves continuity of service; motors and control that operate the plant machinery.

For driving purposes, 40 motors are used, ranging from 1½ to 100 hp. These motors operate at minimum power demand because of their careful mechanical and electrical design, and the arrangement is such that motor and control units are duplicated to provide maximum flexibility.

All power and control units are simple. These features mean low maintenance expense, few repair bills, and decreased operator expense.

Your plant may be in need of electric equipment that will greatly reduce your present operating expenses. Our specialists in the district office nearest you will be glad to help you in selecting the right G-E equipment for your plant. For complete information on any of this apparatus, address General Electric, Schenectady, N. Y.

011-58

E L E C T R I C

Let's Look at Cordeau - -

for Better Blasting

Cordeau is the hook-up *and* detonator combined. It detonates *every* cartridge in the hole. It connects every hole. Thus it insures the *practically* simultaneous detonation of the entire blast.

We say *practically simultaneous* because the detonating wave of Cordeau travels at a speed approximating 3 miles per second. This speed, fast as it is, nevertheless permits a hook-up planned to give shots in rotation and thus relieve burden.

With each shot able to exert its maximum power in fragmentation and removal, you have more work from your explosives—*better blasting.*

Have you read the Cordeau Book? It's free.

CORDEAU PAYS IN 5 WAYS

1. Simplified loading
2. Less Hazard
3. More work from your explosives
4. Better fragmentation
5. Fewer but bigger shots (Equipment moved less often)

Write for the Cordeau Book.

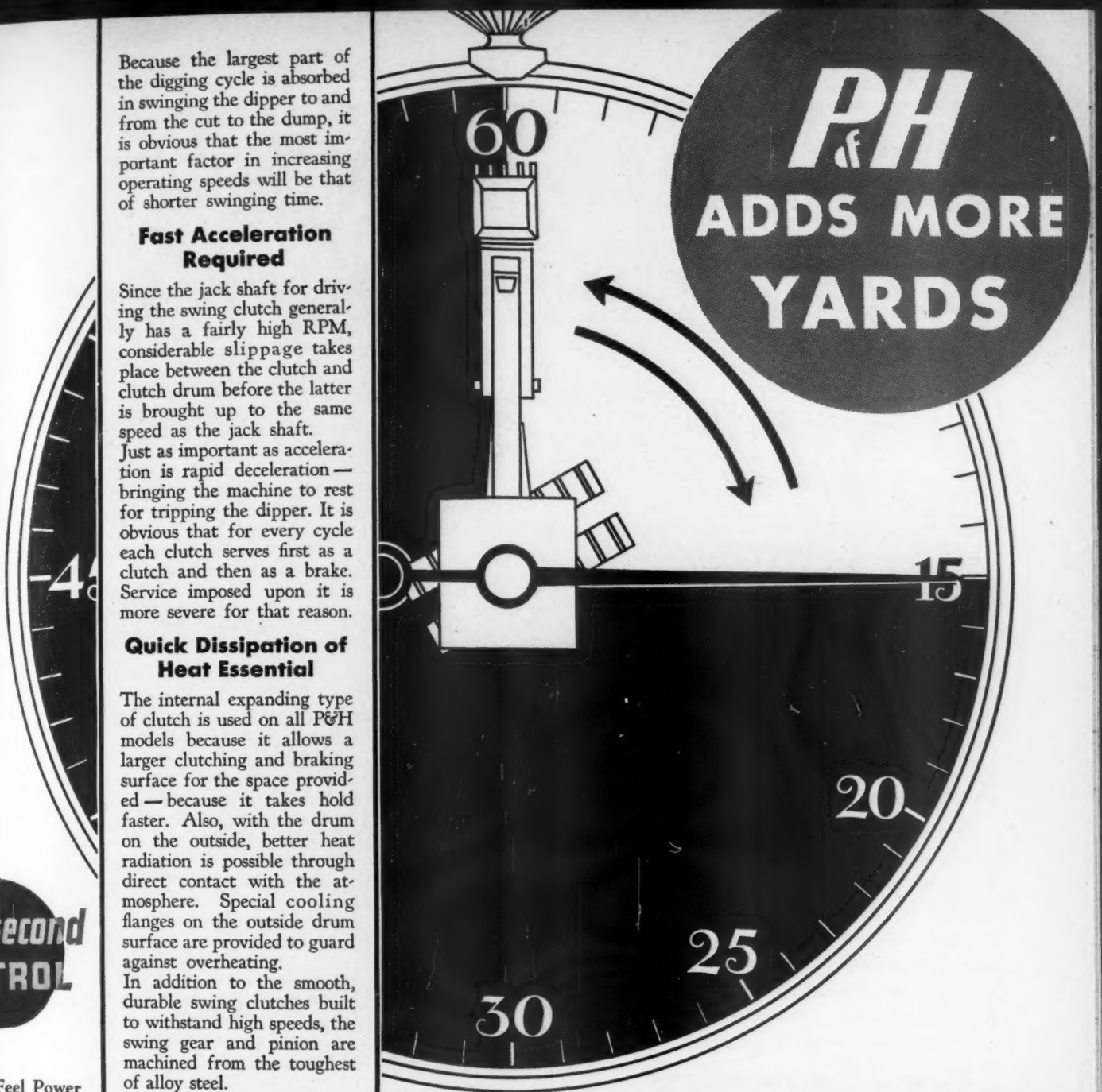
CORDEAU
DETONATING FUSE
BICKFORD

ALSO SAFETY FUSE *Since* 1836

CB-48

THE ENSIGN-BICKFORD COMPANY

SIMSBURY, CONNECTICUT



P&H ADDS MORE YARDS

Because the largest part of the digging cycle is absorbed in swinging the dipper to and from the cut to the dump, it is obvious that the most important factor in increasing operating speeds will be that of shorter swinging time.

Fast Acceleration Required

Since the jack shaft for driving the swing clutch generally has a fairly high RPM, considerable slippage takes place between the clutch and clutch drum before the latter is brought up to the same speed as the jack shaft.

Just as important as acceleration is rapid deceleration — bringing the machine to rest for tripping the dipper. It is obvious that for every cycle each clutch serves first as a clutch and then as a brake. Service imposed upon it is more severe for that reason.

Quick Dissipation of Heat Essential

The internal expanding type of clutch is used on all P&H models because it allows a larger clutching and braking surface for the space provided — because it takes hold faster. Also, with the drum on the outside, better heat radiation is possible through direct contact with the atmosphere. Special cooling flanges on the outside drum surface are provided to guard against overheating.

In addition to the smooth, durable swing clutches built to withstand high speeds, the swing gear and pinion are machined from the toughest of alloy steel.

Strength and Speed Combined

P&H machines use the external type of swing gear with the swing pinion mounted at the rear. When the machine tips forward under heavy load, the swing pinion tends to move away from the combined swing gear and roller path to avoid strain and damage. It has the additional advantage of *forcing out dirt* and other obstructions instead of collecting them to ultimately clog the gears.

split second CONTROL

1. Sure Feel Power Clutches
2. Self Starter
3. Power Dipper Trip
4. Super Smooth Swing Clutches
5. Rapid Reversing Crowd Planetaries
6. Full Vision Cabs

BY *SPLITTING* SECONDS *on the Swing*

Watch one of these P&H's hit its stride and you'll see why we talk about this super smooth swing clutch—why it obsoletes all other types.

It's the faster get-away and the quicker stopping that cut down swinging time and make possible more passes per hour. Remember that swinging time absorbs up to 67% of the digging cycle.

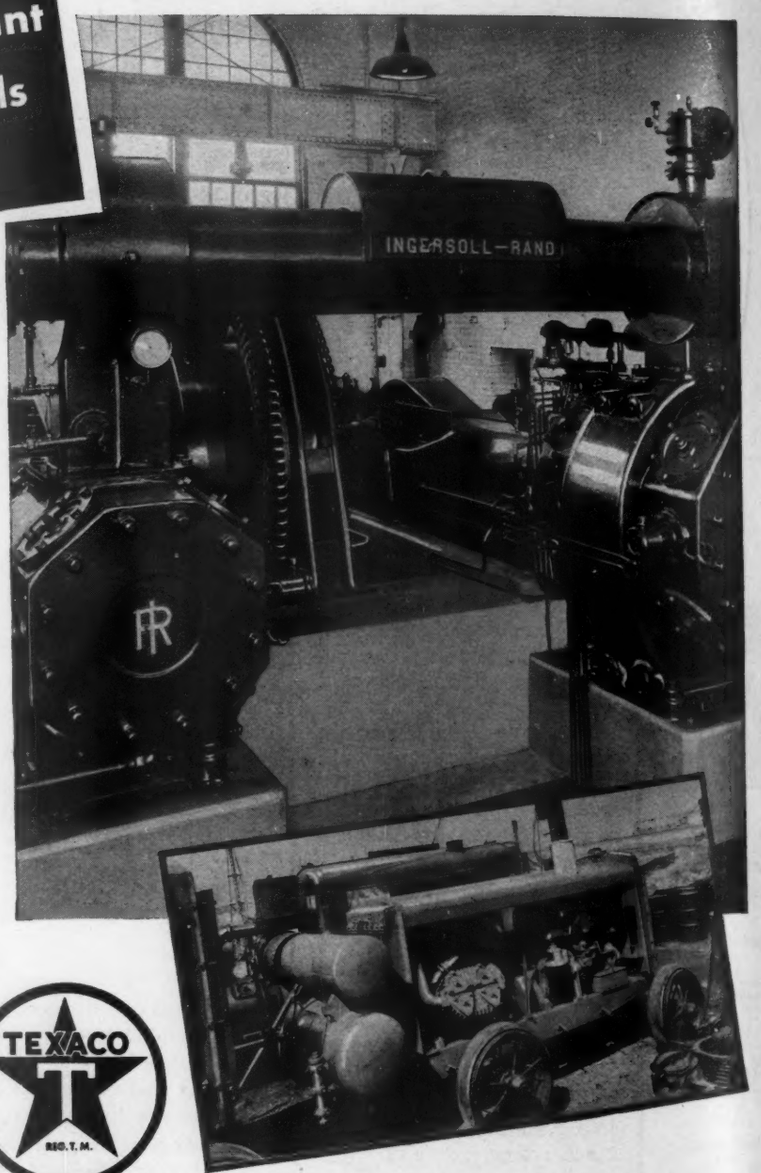
This quick-acting clutch is built for punishment. It's an internal expanding type . . . air cooled with a grooved periphery drum surface. The simplest kind of adjustment keeps it at top notch efficiency. It's a Split Second feature that really piles up extra yardage.

HARNISCHFEGER CORPORATION
4465 W. NATIONAL AVE. *Established 1884* MILWAUKEE, WIS.
Warehouses and Service Stations:
Hoboken Memphis Jacksonville Seattle Dallas Los Angeles San Francisco

P&H PERFORMANCE
SPEEDS UP YOUR PROFIT PACE

EXPLOSIONS -- *caused drop by drop*

That's why it is important to make sure your oils are right!



UNSUITABLE OILS and excessive oil feeds will build up deposits of carbon without warning. The best safeguard is to choose oils that will minimize carbon deposits on valves, passages, ports, and airlines.

Texaco Cetus, Texaco Alcaid, Texaco Algol, and Texaco Ursa, are exceptionally free from carbon-forming elements. Because of their extreme "oiliness" they maintain an unbroken film and yet can be fed in very small quantities. Their unvarying quality and uniformity insure lowered maintenance expense—less time out for cleaning — and less danger!

Your men know what your compressors are up against. The Texaco representative knows which lubricant is best suited to a specific condition. Letting them work together goes a long way toward safety, efficiency, and economy.

THE TEXAS COMPANY

135 East 42nd Street • New York City

Nation-wide distribution facilities assure prompt delivery

TEXACO

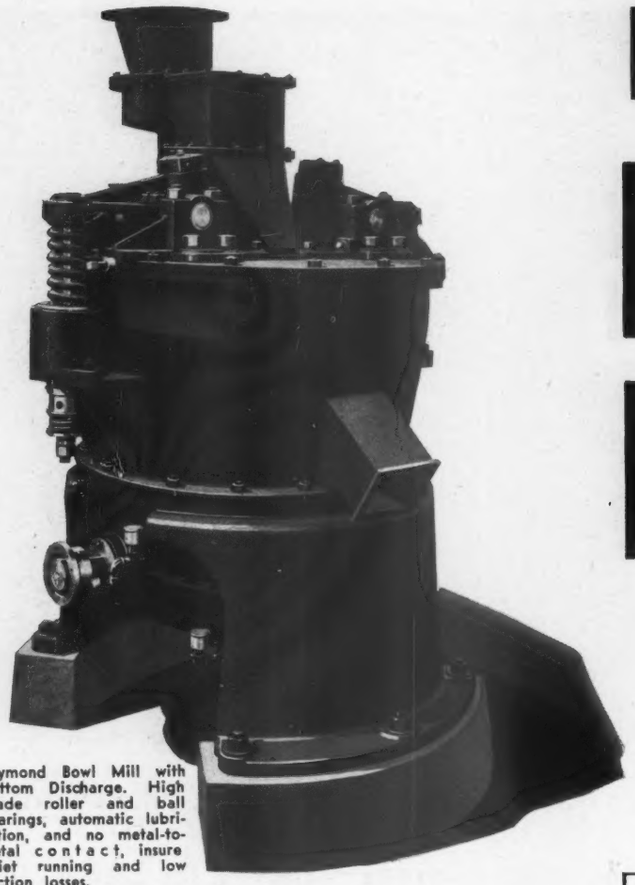
REG. T. M.

TEXACO *tested* LUBRICANTS

REFINERY TESTED FOR UNIFORMITY • • • SERVICE TESTED FOR ECONOMY

Raymond BOWL MILL

for fine or coarse grinding



Raymond Bowl Mill with Bottom Discharge. High grade roller and ball bearings, automatic lubrication, and no metal-to-metal contact, insure quiet running and low friction losses.

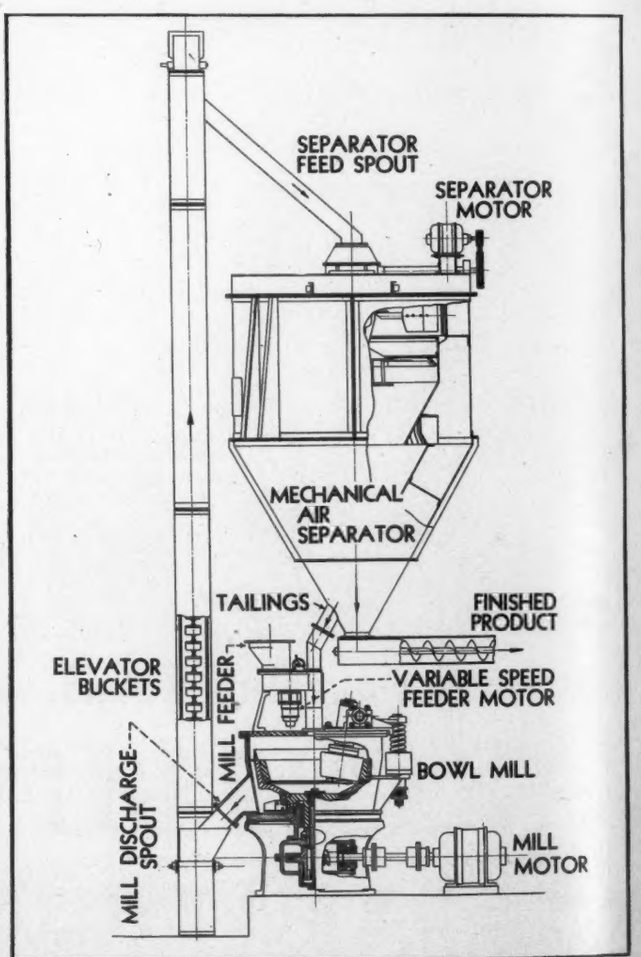
IF the Bowl Mill applies to your problem, you can use it and gain the advantages that go with this modern method of pulverizing. Brought to completion in 1935—climaxing 48 years' experience—it is so far advanced in mechanical efficiency, as to give you a distinct "edge" over competitive plants.

Originally applied to coal, the Bowl Mill is equally suited for other non-metallic minerals and certain manufactured products, as in custom grinding. Limestone, gypsum, bauxite, are a few of the materials within its broad range of use.

For pulverizing up to 325-mesh fineness, you can operate the Bowl Mill in closed circuit with a Raymond Mechanical Air Separator, obtaining a uniform product at a record low cost per ton. For coarse stuff, down to 10-mesh, you can arrange the mill to discharge on screens, getting extra large capacities.

The economies of the Bowl Mill would justify re-equipping your plant now, in anticipation of heavy demands for rock products of all kinds in 1936. In power savings and improved production, this machine actually liquidates its cost in a matter of months.

We invite your inquiries, and suggest that you submit samples for running a Bowl Mill test on your materials.



RAYMOND BROS. IMPACT PULVERIZER CO.
Division of Combustion Engineering Company, Inc.
1307 North Branch Street Chicago
Sales Offices in all Principal Cities
Canadian Representative:
Combustion Engineering Corporation, Ltd., Montreal

THE new high output capacity of the modern 120-B is combined with the convenience and economy of quick and inexpensive field convertibility. Move it out of the pit in the off season . . . it moves fast and climbs almost unbelievable grades . . . put it into the stripping with a long-range dragline boom. And when the stripping is out of the way, back goes the 120-B to the rock face . . . with all the husky power and speed that has made it "king of the 4-yard shovels." As efficient a dragline as a shovel, the new 120-B can make profits for you.

versatile

BUCYRUS-ERIE

EXCAVATING, DRILLING, AND MATERIAL-HANDLING EQUIPMENT . . . SOUTH MILWAUKEE, WISCONSIN

TIGER BRAND WIRE ROPE *Helped Build* BOULDER DAM

TIGER BRAND
REG. U. S. PAT. OFF.
WIRE ROPE

Tiger Brand Wire Rope is available in Standard (non-preformed) or Excellay (preformed) constructions

Use Tiger Wire Rope Clips—identified by their yellow base.

OVER 160 miles of **Tiger Brand Wire Rope and Cable** were used in the construction of Boulder Dam—on cableways, excavators, elevators, bridges, slings, etc. Many of the Ropes were special constructions. In every field of application—the chances are you will find **American Steel & Wire Company Tiger Brand Wire Rope** doing the work—doing it better and more economically. This widespread preference is based on proved service records—and on the knowledge that no problem is so large or so small that our engineers will not welcome an opportunity to cooperate.

AMERICAN STEEL & WIRE COMPANY

208 S. LA SALLE STREET, CHICAGO • • EMPIRE STATE BUILDING, NEW YORK

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Rock Products
With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Volume XXXVIII Chicago, November, 1935 Number 12

Annual Industry Conventions Can Serve Very Useful Purpose

May Be the Only Way to Reconcile Individualism with Joint Action for the Common Good

DISCUSSING with a German friend the political situations in Germany and in this country, he stoutedly defended all that has transpired there as essential to efficiency and effectiveness in meeting critical national problems. People must be made to do what is good for them—that is, of course, what is good for the body politic. The reason we Americans do not accomplish more, he inferred, is because our government is handicapped in enforcing its decrees by the stubborn individualism of certain groups working at cross purposes.

The obvious answer is that we Americans (in fact, probably, all English-speaking peoples) do not expect a high degree of efficiency and effectiveness in meeting national problems, foreign or domestic, that we are accustomed "to muddle through," that that is the price we pay for those individual liberties which in a better, or more efficiently, organized state the people do not have —we can't use the common expression do not "enjoy," because the happenings of the last few years prove, apparently, that many people really *do not enjoy* individual freedom or liberty—they had rather have someone tell them what to do than take the responsibility of finding out for themselves.

The *enjoyment* of individual freedom is partly a matter of inheritance and tradition, and partly of individual and national character. We explain incapacity to enjoy individual freedom in some countries by a lack of inherited characteristics; but when a large section of our own Americans would surrender individual freedom in favor of government dictation, it can only be explained as a weakening of our inherited characteristics—a breakdown of our national character. Some Americans in the academic class apparently can no longer enjoy individual freedom at the expense of the inefficiency and incompetence inseparable from our form of government—although it has never been proved that a dictatorship is any more effective in the long run. Some are so broken in spirit by loss of employment and by government paternalism that they are no longer capable of looking after themselves.

The academic class of citizens has had recently and still has a pretty big influence in the direction of affairs, from the President down. It is a natural reaction from a period of extreme materialism to one of academic altruism. However, the experience of the last year is ample proof that national characteristics, while temporarily submerged, are not easily changed; and since it is proved that they can't be changed by government decree, it is a duty of the individualists of business to see if these stubborn characteristics can be retained and cultivated and utilized to accomplish some of the objectives of the academicians, that a majority of the population insists upon.

Voluntary trade or industrial associations are a typically American institution. You don't have to belong to them; you don't have to submit to any of their rules or regulations; you don't have to solicit membership in them, they seek you out; they exist to serve you, and if in your humble opinion they don't do it, you can tell them to go to h—l. Many of us rejoice because interpretation of our fundamental law to date upholds this attitude of pure Americanism.

Meetings Should Be More Like Open Forums

But we can not pursue a course that in the midst of a conflagration merely says "there ain't no fire." If we decide, as apparently we have, that it is better to muddle along in government than to load on that government new duties and powers that it is obviously incapable of administering, we can not at the same time take an indifferent view of the only other means at our disposal of meeting national problems intelligently and collectively. That may be the function of a national industrial association. It can be an unbiased means of determining, studying and presenting such problems for expression and crystallization of thought, opinion and action of influential groups in the body politic.

For that reason we think that annual meetings or con-

ventions should be open forums for the free expression and reception of the thoughts of the members of the industry rather than be devoted to many set speeches from outsiders however conspicuous or distinguished they may be. A little educational "propaganda" is perhaps helpful, but we have never attended such a convention where the "home talent" was given an adequate opportunity to develop that democratic kind of leadership in thought and action, which is so typical of our mode of formal government. Industrial associations still have to govern their industries, not by the coercive methods of NRA, but in the good old American way in which everyone imagines he is a prime factor in determining all policies—inefficient but in keeping with our character.

Since we do not have unanimous observance of so august a law as the Constitution itself it is quite obvious that we can not expect unanimous observance of rules of honor and ethics of an industrial association. We just have to continue to struggle along, as we do in government, with the help only of a majority who can be relied upon to be honest and honorable, if correctly informed as to what is right. The majority must stick to fundamental principles irrespective of what a minority may do.

"Some day," said Roger Babson recently, "industry, integrity, righteousness, and the desire to be of service will be revived, and then the curve of the standard of living will go up again." In spite of a period of prosperity he sees coming upon us, he thinks there will be a decline in the standard of living, because "this administration, in spite of the many admirable things it has done, has taught the people that they can be made comfortable without working." As workers ourselves and as employers of workers, collectively through our industrial associations, and individually by spreading the gospel in other ways, we must do something to rehabilitate our country as well as our manufacturing plants.

Industrial associations are the only practicable approach, under our American institutions, to the problem of collectivism, which is admirably defined by Thomas F. Woodlock in a recent issue of the *Wall Street Journal* as follows:

It is, perhaps, not inaccurate to say that the one thing that has brought to an end the regime of unrestricted *laissez-faire* is that it has completed its job. That job was to explore, annex, develop ("exploit," if one prefers the word) and knit together all parts of the world and gather us, after a fashion, under one roof by transportation, by trade, by interchange of ideas, of knowledge, of methods, of patents, of secrets and of machines. Now we have to learn to live together in some kind of approach to peace—peace at home and peace abroad.

Collective life means planned life; planned life means planners; planners mean plans, and plans mean principles. Planned life means life in which, as in an automobile engine, each part yields to some other part and the whole is based upon a mass of compromises, which produce smooth action. Above all, it means a will on everyone's part to accept the adjustments involving some sacrifice of freedom in action and in many cases sacrifice of property rights and even property itself. Also, of course, there must be planners in whom we all have confidence as to both ability and intention.

All of which is to say that men being what they are in the world today, the best that we could hope for in practice would be a very modest fraction of the theoretical possibilities. Now, the fact is that our own experiment in the more collective life is handicapped by a very serious drawback in that we are approaching it in a series of large jumps in the form of new laws, and in a state of mind which is anything but a spirit of mutual tolerance and accommodation as between groups and persons. Our reform measures have almost all a definitely punitive flavor and the spirit in which they have been discussed and passed has been one in which group-hatreds have been far more in evidence than any other emotion.

Regular attendance at conventions of industrial associations, in fact all attempts at unity of group action or group thought, involve a training in tolerance and promotion of a spirit of compromise. Of course, such groups can, and often do, help to promote antagonisms, but with a proper regard for principle this can be avoided.

Whatever happens to the New Deal, the New Dealers have given an example of meeting national issues rather than dodging them, that will have lasting effect on our institutions.

Cement Prices Up

Los Angeles, Calif.: Cement prices here and in southern California went up about the middle of October to $1.75 per bbl., or, with all discounts deducted, $1.55 net, to dealers. This is 15c more than has been quoted. The San Francisco base price is $2.22 per bbl., less 10c cash discount.

Plant Reopened

Colorado Portland Cement Co. resumed production at its Boettcher, Colo., plant September 15. This plant had been out since the latter part of July. About the same time the company suspended production at its Portland, Colo., plant, probably until next spring. Shipments from stock will, of course, continue.

Possible New Florida Plant

Lehigh Portland Cement Co., Allentown, Penn., received much publicity lately in Florida newspapers, as part of the well-known "boost Florida" campaign. It was said the company would build a new plant at Ocala. In answer to an inquiry from the editor of Rock Products, Joseph S. Young, president of the Lehigh company, said:

"In reply to your inquiry of October 14 re contemplated construction of a cement plant at Ocala, Florida, may I clarify our position by stating at the outset that, although we are seriously considering the Ocala site, we have no definite plans at the moment for proceeding with the actual erection of a plant. As you possibly know, the company owns approximately 1800 acres of limestone and clay deposits just north of Ocala. The route of the Canal as presently surveyed passes within about a mile and a half of our clay properties. Because the transportation facilities afforded by the Canal when finished will permit easy access to many of the important markets not only in Florida but also along the Gulf coast, the Ocala site will have natural advantages superior to any other location we now own in the southeast. Whenever definite plans for an Ocala plant are formulated we will be only too glad to let you know."

Expects Rebuilding

Universal Atlas Cement Co., Leeds, Ala., plant, according to local report, may be included in the United States Steel Corp.'s rehabilitation program. It is said about $1,250,000 has been requested for complete rebuilding of the plant.

Half Million Dollar Expansion Program

National Gypsum Co., Buffalo, N. Y., through M. H. Baker, president, has announced plans to spend between $400,000 and $500,000 enlarging and modernizing the plants of the former Universal Gypsum and Lime Co., recently taken over by National. Fort Dodge, Ia., reports say $110,000 will be spent there.

At the same time an aggressive advertising and sales campaign was announced. Batten, Barton, Durstine & Osborn, Inc., well-known New York City advertising firm, will handle the advertising. Meetings have been held throughout the country to assure salesmen that the Gypsolite and Universal brand names would be continued.

F. I. Marsh, Jr., who has been Eastern representative of National in New York City territory, has been made manager of the Southwestern district office at Dallas, Tex. The Universal has a wall board and gypsum products plant at Rotan and a lime plant at Lime City, Texas.

The Universal organization is continued with M. H. Baker, president and chairman of the board; R. F. Burley and Gordon H. Tarbell, vice-presidents of National also vice-presidents of Universal, and Frank G. Krumhold, Universal vice-president, continuing to serve.

New Gravel Project

Rockhill Quarries Co., St. Louis, Mo., has purchased a 30-acre tract in Valley Park for the purpose of developing a sand and gravel dredging operation. Local property owners are attempting to block the project.

Adds $150,000 Unit

Pioneer Sand and Gravel Co., Seattle, Wash., has begun construction of new production facilities at Steilacoom to cost $150,000. The new unit will have a capacity of 250 tons per hour and make nine sizes of gravel, four of sand and four of crushed stone.

Denied Permit to Erect Plant

Mills Brothers, Inc., Westport, Conn., were denied permission to erect a sand and gravel plant, on the Coleytown road, by the zoning board of appeals. More than 50 residents opposed the proposed plant.

Roofing Granules by New Process

Emeralite Surfacing Products Co., Ely, Minn., has recently installed machinery and equipment to make artificially colored roofing granules. Charles Douglas, formerly with the Barrett Roofing Co., is in charge of sales.

Don't Miss These Conventions!

ST. LOUIS, MO., January 27-31, the National Crushed Stone Association, the National Sand and Gravel Association and the National Slag Association will hold their annual conventions. There will be a splendid program, one day being devoted to the Mineral Aggregates Institute. Also there will be a joint exhibit of the Manufacturers' Divisions. Next year promises to see some of the public works, scheduled for this year, well under way, and there is a considerable program of private construction in sight. There certainly will be much to talk about, and preparations must be made for meeting many grave problems of the industry. If you want these industries "on the map" in 1936, you should not miss these conventions, Mr. Mineral Aggregates Producer!

New Diesel-Powered Stone Plant

Louisville Crushed Stone Co., Louisville, Ky., recently completed a 700-ton per day crushed-stone plant on Popular Level Road and Taylor Ave. Ralph Rogers is owner and Frank H. Lanham, manager. Limestone is quarried from a 52-acre tract recently opened. Power is provided by three Caterpillar Diesel engines developing 400 hp. The product is washed. The company has received a large order from Jefferson county. Agricultural limestone is also produced.

To Expand Operation

Stony Brook Quarry Co., Dansville, N. Y., Thomas F. Acomb, general manager, and Percy Behe, superintendent, has developed a quarry originally opened last winter as an FERA project into a 500-ton per day commercial crushed stone operation. It is said the owners contemplate extensive improvements and expansion.

New Location

A. A. Griffin, Williston, Fla., is moving his rock-crushing plant to High Springs, Fla. Operation at the new site will commence about December 1.

Portland Cement Pavement Yardage

AWARDS of concrete pavement for September, 1935, were announced by the Portland Cement Association as follows:

	Sq. yd. awarded Sept., 1935	Total Sq. yd. for year to date, Sept. 28, 1935
Roads	3,766,275	18,004,104
Streets	884,995	7,125,747
	4,662,972	25,244,758
Alleys	11,702	114,907

Finds Big Demand for Agstone

Mississippi Lime and Material Co., Alton, Ill., is experiencing the largest demand for agricultural limestone in several years, according to a local newspaper, which quotes H. B. Matthews, president of the company.

The area being supplied out of Alton takes in territory 100 miles to the northward. Mr. Matthews estimated that his plant was delivering 150 truck loads a day to truckers who come here to get the stone for farmers.

The truckers haul loads of stock and grain to market and on their return trip call at the plant and get loads of stone for delivery to the farmers. The farmers have been neglecting to keep up their farms because of money shortage for a few years and now have come to the place where they are finding their lands must be given treatment with agricultural limestone.

The real rush began with the harvesting of the wheat crop, through which the farmers began to get some ready money.

Resumes Operation

North American Cement Corp., Hagerstown, Md., plant resumed operation October 16 after a shutdown since August 1.

New Cement Plant Rumor

Birmingham, Ala., newspapers have been publishing rumors that "one of the big cement companies" is contemplating building a new plant there.

September Cement Shipments

The portland cement industry in September, 1935, produced 7,173,000 bbl., shipped 7,799,000, and had in stock at the end of the month 21,789,000. Production in September showed a decrease of 6.6% and shipments an increase of 5.6%, as compared with September, 1934. Stocks at mills were 0.3% higher than a year ago.

The total production for the nine months ending September 30, 1935, amounts to 56,066,000 bbl., compared with 60,781,000 in the same period of 1934, and the total shipments for the nine months ending September 30, 1935, amount to 55,651,000 bbl. compared with 58,700,000 in the same period of 1934.

The statistics here given are compiled from reports for September, received by the Bureau of Mines, from all manufacturing plants except one.

In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 162 plants at the close of September, 1935, and of 163 plants at the close of September, 1934.

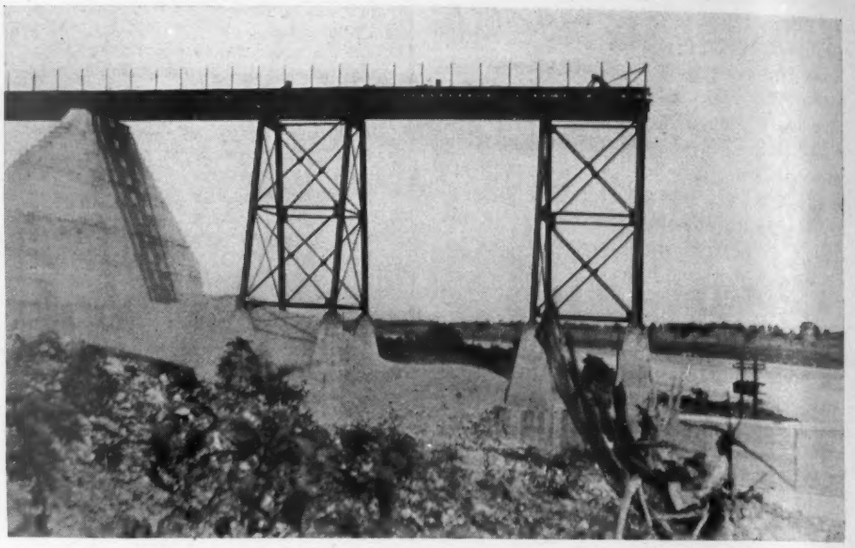
RATIO (PERCENT) OF PRODUCTION TO CAPACITY

	September 1934	September 1935	Aug. 1935	July 1935	June 1935
The month	34.8	32.6	31.8	35.3	39.6
12 months ended	27.6	27.3	27.4	27.7	27.7

TUNNEL and SCREENING PLANT Recently Built for SHIPMENT of Sand and Gravel BY WATER

A WATER TERMINAL to be used for loading barges with sand and gravel for shipment on the Lakes-to-Gulf deep waterway was completed by the Chicago Gravel Co. at its Joliet (Rockdale) plant in August. The installation consists mainly of a concrete tunnel, above which has been built an overhead trestle, and a screening plant for rinsing the aggregate at the water's edge.

Standard-gauge rail has been laid from the bins of the plant proper to the tunnel. This railway travels on high ground to a point approximately 600 ft. from the west side of the channel, where there is a sudden drop-off in contour and a lower elevation is maintained to the water's edge. A steel and concrete trestle has been built out from this drop-off point, a distance of approximately 500 ft., toward the waterway, so that cars can continue out on the rail over and above the land of lower elevation. The elevation above ground of the east (in) end of the trestle is 60 ft.



End of trestle which brings the railway track from the Rockdale plant of the Chicago Gravel Co. to the new waterway terminal

Five storage areas—one for concrete sand, and four for different sizes of gravel—have been provided on the ground level below the trestle by concrete piers 60 ft. high and 80 ft. wide with 100-ft. centers. Sand and gravel is hauled by locomotive in 100,-000-lb. Sommers ore cars directly from the plant bins out over the trestle, where the aggregate is dumped into its proper bin.

A concrete-lined tunnel, ventilated by two chimneys near the dead end, 8 ft. in width and 7 ft. high, passes below these storage areas, the total length being 486 ft. from the mouth (east end of trestle) of the tunnel, to the west end, the tunnel passing completely under the five storage areas. A Robins conveyor, 1150 ft., c. to c., with 36-in. belt passes completely through the tunnel and carries the sand and gravel to the screening plant at the water's edge.

There are 17 equally-spaced manholes 20 by 24 in. in the top of the tunnel to permit dropping the aggregate by gravity from the bins on the belt. One manhole under each storage area is fitted with a wire and pulley control, so that it can be opened or closed at will by the operator at the screening plant. For normal demands, only these manholes will be used. The operator can load as much of any size as he desires, or any proportion of sizes, at his control station at the screening plant. All other manholes are opened by hand. The tunnel is equipped with a lighting system, and is sufficiently roomy to permit working men to easily operate the manhole gates. The 36-in. belt is driven by a 50-hp. G. E. motor by means of a V-belt drive.

The conveyor discharges its load to the screens direct. The screening plant, which is of I-beam, channel and angle-iron construction, is 50 ft. high and is to be enclosed at a later date by sheet iron. As the material passes up on the inclined conveyor, it is weighed near the top by a Merrick recording Weightometer scale.

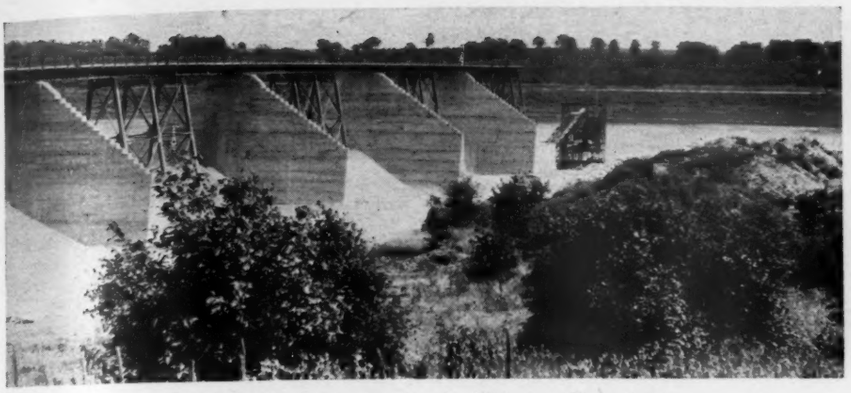
The screening plant is equipped with four 4- by 10-ft. stationary screens inclined at a 45-deg. angle, one over the other, reversing the direction of flow. Each screen is equipped with ¼-in. mesh, the purpose of the screening being to give the gravel an additional wash before shipping.

The discharge from the Robins belt is split at the top, each half going over one of the upper screens. Perforated pipe sprays clean the gravel as it passes over these screens.

Gravel retained on the No. 4 screen passes to the screen below (half on each side), where it is given another rinsing. The screens are housed below, so that the water and undesirable material can be directed to an 8-in. pipe, to carry it away to sumps on each side of the plant. Wash water is supplied by a 6-in. American Well Works pump.

After the second rinsing, the gravel to be loaded passes to a 42-in. Robins shuttle belt conveyor, 60-ft. centers. The shuttle is driven with a chain drive by a 25-hp. G.E. motor. It travels on rails spaced 6 ft. apart and has a travel of 24 lin. ft. The shuttle

Waterway terminal loading plant of the Chicago Gravel Co. before being housed in



Ground storage over tunnel—Chicago Gravel Co.

loads directly into the barges. The plant is so set up that one-half (one upper and one lower screen) of the screening operation only can be used, if so desired; and the shuttle belt speed and the tunnel belt speed can both be varied at will.

Sand does not pass over the screens but goes to the shuttle belt by a by-pass chute.

Normally, 1200-ton steel barges, 175 ft. long by 40 ft. wide, are loaded. The loading belt is capable of loading 750 tons per hour.

The channel of the waterway is 9 ft. deep but at the plant site it has been dredged to a 12-ft. depth. The I-beam corner posts are set on 15-ft. concrete foundations, designed to be safe if the channel should be lowered to a 14-ft. depth at a later date. The Milwaukee Bridge Co. and the Stephens-Adamson Manufacturing Co. were the steel fabricators. The plant was started March 15 and requires the services of only one operator, all controls being placed at the one panel board.

Primary Crusher Changed

Georgia Lime Rock Co., Clinchfield, Ga., has improved its operation by moving its primary crusher down to ground level and dumping the quarry cars into it from grade. Formerly the crusher (an Allis-Chalmers roll) was high in the plant and the quarry cars were hauled up inclines. A new 42-in. Robins belt conveyor now carries the product of the primary crusher to the plant proper.

New Quarry Opened

Seminole Sand and Gravel Co., Miami, Fla., bought out the former Atlas Rock Co. about two years ago and somewhat changed the method of operation. The material is soft coral rock, which was formerly brought to the plant in barges and unloaded to the top of the plant by a derrick and bucket. Subsequently a pit nearer the plant was opened. The 12-in. overburden is removed and the rock excavated by a Bucyrus 50B shovel. This rock is piled in windrows and allowed to drain 24 hours, when it is loaded by a Northwest 1-yd. shovel into 5-yd. motor trucks, which haul it about a half mile.

Miami Anticipates Building

Maule-Ojus Rock Co., Miami, Fla., has increased its facilities by addition of a Blaw-Knox batching plant and six Blaw-Knox truck concrete mixers. The mixers are mounted on special Ford V-8 chassis. The batching plant has a two-compartment bin of 100 tons' capacity and a 1½-yd. batcher.

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W. M. Dabney, Inc., Miami Beach, Fla., has added four new Jaeger concrete mixer trucks to its fleet.

Production Resumed

Lehigh Portland Cement Co. has resumed production at its New Castle, Penn., plant after a shut down of several months.

Develops Old Gypsum Mine

Dolomite Products Co., Rochester, N. Y., of which John H. Odenbach is president, bought the old Lycoming gypsum mine near Wheatland, N. Y., three years ago. In the three years he has increased its output from 9000 tons annually to 55,000 tons last year. The raw gypsum is sold chiefly to cement companies. The operation has been thoroughly modernized and is now one of Mr. Odenbach's show places.

Two Illinois Producers Get Big Contracts

McGrath Sand and Gravel Co., Lincoln, Ill., was recently awarded a contract for 200,000 tons of sand and gravel for the Mississippi River lock at Davenport, Ia. This is said to be the largest single order ever obtained by the company in its 27 years of business. The company has several modern plants in central and western Illinois.

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Western Sand and Gravel Co., Spring Valley, Ill., is operating night and day to fill orders for over 100,000 tons of sand and gravel received as a result of recent highway lettings.

For Better Concrete Masonry

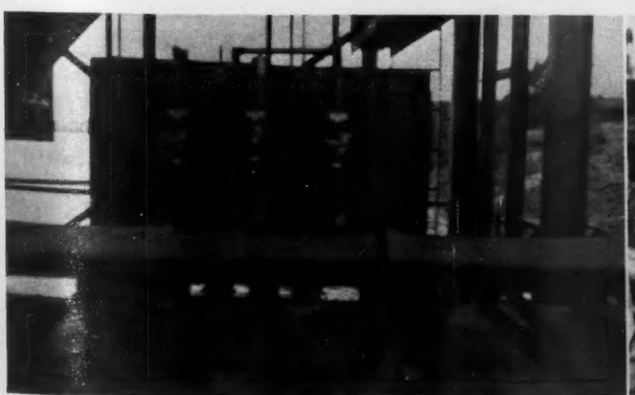
CHARLES J. HARTLEY, of the Elmhurst-Chicago Stone Co., Elmhurst, Ill., was recently elected president of the Northeast Illinois Concrete Masonry Association, a group organized some time ago to raise the standards in the concrete products industry.

To Make Truck-Mixed

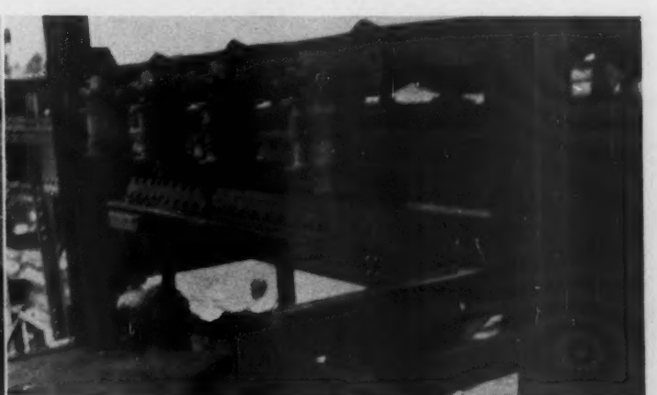
Charles F. Eggers Co., Uniontown, Penn., lumber and builders' supply dealer, has installed new equipment for making truck-mixed concrete.

Adds Concrete Products

Clear Lake Sand and Gravel Co., Clear Lake, Ia., has added to its plant a multiple-press concrete block machine and concrete mixer, and is turning out 500 blocks of various shapes and sizes daily.



Control panel of the Chicago Gravel Co.'s waterway loading terminal



Pulleys and cables from which the bin gates over tunnel conveyor are operated

Sample of a Recent, Well-Designed, Pumping Operation

Central Mississippi Sand and Gravel Co., Crystal Springs, Miss., has a relatively new 10-in. Amsco pump operation (two years old), driven by a 300-hp. General Electric motor. The pipe discharges directly on a ¼-in. flat plate, 10 ft. by 12 ft., built in 3- to 4-ft. sections and sloping approximately 9 in. in the long direction, toward the flat screens below. The material is spread out on this "table" and passes down to the lower end of the table where there is a partition, splitting the flow to fall on two flat screens, side by side below, which are 3 ft. by 6 ft. and slope at an angle of 43 deg., back under the first screen. These flat screens are inserted to lighten the load on the vibrating screens. A Niagara screen 3 ft. by 8 ft., having a triple-deck, sizes the material in three sizes after it leaves the flat screens. A spray of water under 50-lb. pressure from a pipe with many perforations washes the gravel as it passes over the Niagara screen. The pipe is 18 in. above the top of the screen and runs transverse to it. A crude 3-ft. square gate swinging from one of the beams above the Niagara is used to slow down the movement of the gravel and keep it from jumping off the screens. It rests on the screen and gravel passes under it. An Allis-Chalmers pump having a 4-in. stroke and 5-in. cylinder is used to supply the wash water. After passing the screens, the gravel goes to bins. A 10-in. pipe carries the oversize to a crusher. This is a Symons 4-ft. cone crusher, which reduces the gravel to a range of 16-mesh to ¼-in. A 20-in. bucket elevator elevates the crushed gravel 75 ft. to a Link-Belt double-deck screen, 4 ft. by 5 ft. The oversize is carried back for recrushing. The crushed gravel then goes to four 20-ton storage bins, directly over the railroad track. The material from ¼-in. down, after going through the Niagara screen, passes to a 22-in. Eagle screw washer and then directly into cars. Waste sand and water passes through wooden chutes and into a sump. An 8-in. dredge driven by a 150 hp. G.-E. rehandles this waste sand and pumps it out of the way, back on the hillside. The deposit runs about 30% gravel. An Allis-Chalmers pump with a 4-in. stroke and 5-in. cylinder operating under a 75-ft. head is used for undercutting the bank.

Markets Overburden and Pea Gravel

Standard Gravel Co., New Hudson, Mich., is now producing a mixture of gravel, clay and calcium chloride for use in surfacing and maintaining secondary roads. The overburden and pea gravel are used in this product. The overburden of the gravel deposit contains 12 to 15% of "Plastic Index," or actual clay (not silt or sand). The overburden is screened through a 1-in. vibrating screen to remove sticks and oversize.

Trucks haul the overburden to a home-made mixer, where it is dumped. Likewise pea gravel is hauled from the screening plant and dumped into another pile. The mixing plant consists of a home-made wood hopper with a separation, making two compartments. These two hoppers feed below into a home-made mixer consisting of a series of paddles on a shaft (a pug mill).

The pea gravel and overburden are loaded into their respective hoppers by a clam-shovel crane. As they feed by gravity to the mixer, calcium chloride and water are added. The mixer pushes the mixture out into a pit hopper where the same clam-shell picks it up and loads it into trucks.

Calcium chloride and gravel mixer

The mixture consists of 60% rescreened overburden, 40% pea gravel and 12½ lb. of calcium chloride to each cubic yard of the product. Sufficient water is added to maintain a workable consistency. The capacity of the mixing plant is 40 cu. yd. per hour and the final product is sold for $1.00 per cu. yd. on the trucks at the mixture.

Sells "Safety Sand"

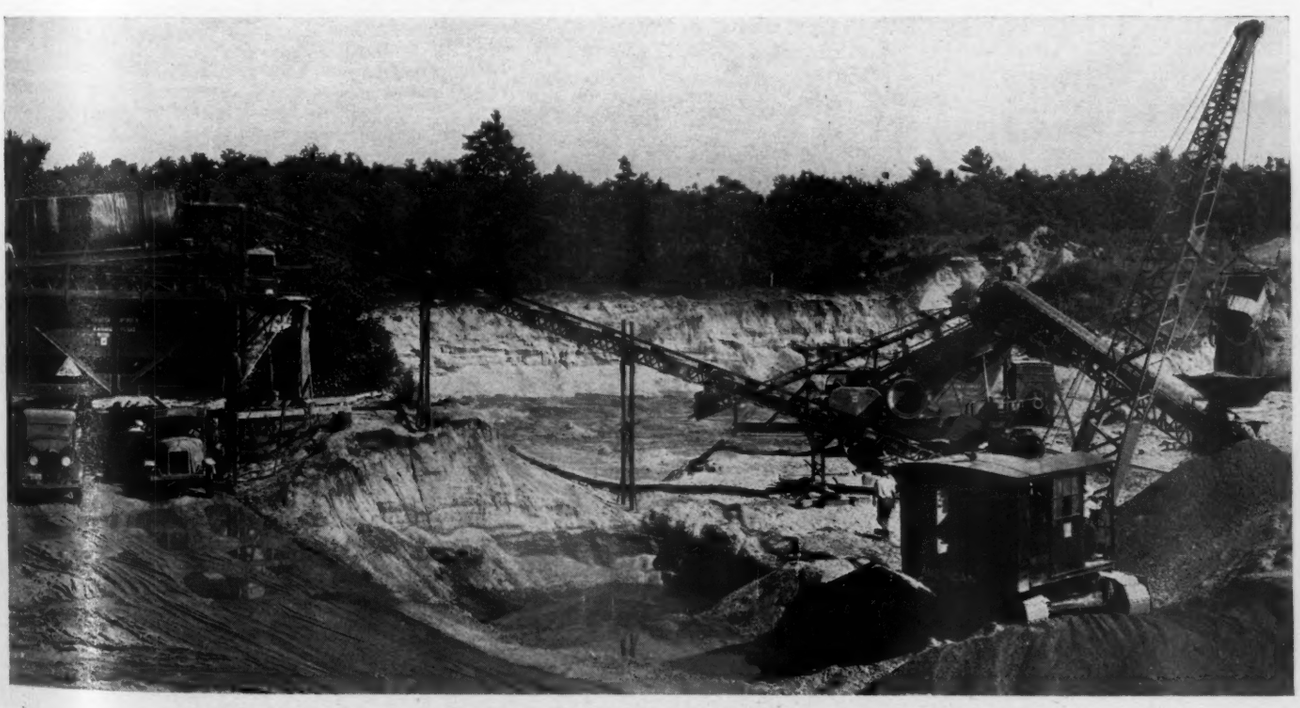
Brookfield Sand and Gravel Co., Wauwatosa, Wis., is mailing an attractive little folder advocating the use of "safety sand for that slippery walk, slippery drive." It is washed and dried and packed in 100-lb. paper sacks.

Pit (pump excavated) and modern new plant of the Central Mississippi Sand and Gravel Co. at Crystal Springs, Miss.

Latest in Semi-Portable Plants Makes Top Dressing Gravel

Operation of the West Michigan Construction Co. near Grand Haven, Mich.

West Michigan Construction Co., Zeeland, Mich., has erected and now has in operation a Pioneer 301W semi-portable sand and gravel plant 10 miles east of Grand Haven, Mich., on Grand River road. The deposit has practically no overburden and is being excavated to a depth of 25 ft. (water level) by an American dragline with a 60-ft. boom and ¾-yd. bucket. The dragline loads motor trucks which dump into the hopper of a 24-in. belt conveyor, 80-ft. centers. Washing and scalping is done in a cylindrical rotary screen, and sizing in a double-deck, 40-in. x 12-ft. shaker screen below. Water is supplied by a gasoline-motored, 6-in. pump from the Grand River. Two sizes of washed gravel and one of sand go to three steel storage or loading bins. There is a surplus of pea gravel, which is being stock piled, with the expectation that it will be in demand for top dressing county highways. A portable, Pioneer No. 38V, duplex crushing plant, rated at 80 tons per hour, can handle over-size. The gravel washing and screening plant is rated at 100 tons per hour.



Close-up of the essential units of West Michigan Construction Co. plant

Industry Plans New Safety Campaign

National Safety Congress Proceedings at Louisville

INTEREST in safety problems and their solution unquestionably is on the upgrade again, and the attendance showed encouraging progress at the annual meetings of the cement and quarry sections of the National Safety Council, in Louisville, Ky., October 15, 16, 17. Papers and discussions presented throughout these sessions were clearly focused on the serious problems confronting these industries, including cement, stone, lime, gypsum and several others. Attendance was better than usual, and, among the cement men particularly, represented those in responsible charge of safety work from coast to coast.

Perhaps the most significant observation concerning these meetings is that they indicated recognition of present accident hazards on the part of the rock products industries and a determination, as well, to bring the current situation under control. The cement industry presented new campaign plans and a new angle of attack; several of the industries offered new ideas and methods. There was also presented a paper outlining ten of the most successful safety campaigns organized by individual cement mills.

New Officers Elected

The Cement Section elected the following officers for the coming year: General chairman, D. C. Coleman, safety engineer, Missouri Portland Cement Co., replacing J. B. Zook, chief engineer, Great Lakes Portland Cement Corp., who has held the chairmanship during the past two years; vice-chairman, Frederick B. Hunt, electrical engineer, Nazareth Cement Co., who follows W. W. Hamilton, deceased; secretary, A. J. R. Curtis, Portland Cement Association; news letter editor, Jack Dempster, Canada Cement Co.

Committee chairmen were selected as follows: Engineering, William Moeller, general superintendent, Lone Star Cement Co. of Texas; poster, M. P. Greer, safety engineer, Marquette Cement Manufacturing Co.; program, W. J. Worthy, superintendent, Medusa Portland Cement Co.; membership, H. A. Reninger, Lehigh Portland Cement Co. The Section executive committee will consist of the officers and the following: E. Posselt, vice-president, International Cement Corp.; H. Vanderwerp, vice-president, Medusa Portland Cement Co.; C. E. Ralston, Pittsburgh Plate Glass Co.; F. E. Town, Manitowoc Portland Cement Co.; J. B. Zook, Great Lakes Portland Cement Corp.; and R. B. Fortuin, Pennsylvania-Dixie Cement Corp.

Resolutions on Death of a Leader

The retiring chairman presented the following resolutions on the death of W. W. Hamilton, Alpha Portland Cement Co., vice-president of the Section, who had been chosen by the nominating committee for chairman in 1936, which was unanimously passed:

WHEREAS: In the passing of W. W. Hamilton, safety director of the Alpha Portland Cement Co., the Cement Section of the National Safety Council has lost a leader who gave himself generously to the humanitarian cause of safety in its broadest aspects, and

WHEREAS: W. W. Hamilton, by his sincere devotion to his chosen work, by his personal characteristics of loyalty, modesty, congeniality and integrity, won the respect and endeared himself as a friend to those whose life he touched, and

WHEREAS: Mr. Hamilton served with distinction as vice-chairman of the Cement Section of the Council for the past two years and as a member of its Executive Committee for many years previous, as a member of the Accident Prevention Committee of the Portland Cement Association, and in important capacities in safety organizations in his home community, therefore, be it

RESOLVED: That the members of the Cement Section, National Safety Council, in annual meeting assembled, record our gratitude to Mr. Hamilton for the inspiration of his work and our deep appreciation for the spirit of coöperation and friendliness which typified his contacts with us, and for the intelligent counsel he brought to our common problems, and be it further

RESOLVED: That we extend to Mrs. Hamilton and to other members of his family, and to former associates in the Alpha Portland Cement Co., our protound sympathy in their great loss. Be it further

RESOLVED: That this action be inscribed on the minutes of this meeting, in tribute to the memory of William W. Hamilton.

Quarry Section Officers

The following officers were elected by the Quarry Section to serve during the coming year: General chairman, Alex. Foster, Jr., Warner Co., Philadelphia, Penn., who replaces Wm. H. Baker, J. E. Baker Co., York, Penn., who served last year; vice-chairman, Russell Rarey, Marble-Cliff Quarry Co., Columbus, Ohio; secretary and news letter editor, N. B. Sipe, J. E. Baker Co.

The following were elected chairmen of the various committees: Poster, H. S. Yotter, General Crushed Stone Co., Easton, Penn.; publicity, J. R. Boyd, National Crushed Stone Association, Washington, D. C.; statistical, W. W. Adams, U. S. Bureau of Mines, Washington, D. C.

The following with the officers will constitute the Section executive committee: V. P. Ahearn, National Sand and Gravel Association, Washington, D. C.; Norman Hough, National Lime Association, Washington, D. C.; O. M. Graves, General Crushed Stone Co., Easton, Penn.; A. L. Worthen, New Haven Trap Rock Co., New Haven, Conn.; W. H. Baker, J. E. Baker Co.

Analysis on Cement Accidents

The address at the opening session of the Cement Section was an analysis of the accident situation in the cement industry by A. J. R. Curtis, Portland Cement Association, who used the figures presented as a logical justification of the new program of safety activities to be arranged for the industry during the coming year. Mr. Curtis said in part:

A year ago we faced a rapidly increasing accident rate. It would be dangerous now to predict a definite improvement even in the face of records which show a 22% reduction in cement mill accidents for the first nine months of 1935 as compared with the corresponding period of 1934. There were 185 temporary and permanent disabilities and 12 fatalities in the 1934 period; the disabilities numbered 147 and the fatalities 7 from January 1 to September 30, 1935. Whether these figures mean actual improvement in the accident rate will depend upon how they will show up when we know the total man-hours of exposure. We seem to be approximately holding our own.

But this year our accident base is as broad as it was a year ago. There are just as many one-accident and two-accident plants and almost twice as many three-accident plants. Our improvement, if such it be, lies in the smaller number of plants and the fewer total accidents in plants reporting more than three accidents during the nine-month period.

Too many plants are having accidents. Of 96 plants reporting for three consecutive years, only 42 showed improvement or even held their own in 1934. We do not find the mass consistency which characterized our reports for ten years past. Lack of consistency means confusion and confusion means that anything can happen and may happen, a dangerous situation to be in.

How shall we remedy this condition?

We will have little to worry about as an industry if we attend to the individual plant problem. In that connection I am going to present two definite suggestions:

First, let us reconstruct plant safety committees to meet present extraordinary needs;

Second, let us see that every employe becomes an active, integrated part of the mill safety campaign under the leadership of the safety committee.

Mr. Curtis then presented a detailed plan for plant safety committees, following this with an announcement of the "Safety Minute Man" movement shortly to be put into motion.

Other Papers

E. P. Newhard, superintendent, Clinchfield, Ga., Pennsylvania-Dixie Cement Corp., followed Mr. Curtis with an interesting discussion on how to sustain interest in safety in a plant that has operated without accident for 1000 days or more. Raymond Stoner, general quarry foreman, Louisville Cement Co., followed with an admirable paper on "Eliminating Unsafe Practices in the Cement Industry."

Joint Session

On Wednesday, October 16, the Cement and Quarry sections met in joint session, with one of the most interesting programs of the entire congress.

M. A. Koffman, secretary, Southwestern Portland Cement Co., and author of that company's safe driving plan, spoke on "A Safe Driving Program in the Cement Industry." Mr. Koffman explained how this program had been developed, what it has accomplished and how it may be applied generally to reduce accidents to company automobiles and trucks. (It is hoped that this plan can be presented in a later issue of ROCK PRODUCTS.)

Following the discussion of Mr. Koffman's paper, Lt.-Col. H. A. Reninger, Lehigh Portland Cement Co., presented a resolution unanimously adopted by the Cement Section, for the addition of a committee on highway safety. The work of this committee will include, first, endeavors to lower the accident toll with respect to company owned trucks and automobiles; then to develop methods attacking the problem which may be offered to those outside this immediate industry.

W. M. Cabaniss, assistant superintendent, Signal Mountain Portland Cement Co., Chattanooga, Tenn., presented a paper on "The Cause and Prevention of Injuries from Machinery in Operation." R. H. MacFetridge, superintendent of the Lehigh Portland Cement Co., Birmingham, Ala., read a "Review of the Best Safety Educational Features Used by Ten Cement Plants" which provided many suggestions for other plants.

Quarry Session

In addition to the annual report of the Quarry Section by Chairman William H. Baker, the section program on Thursday morning, October 17, contained the following papers:

"Dust Hazards in the Quarry Industry," by J. William Fehnel, chemist, Industrial Hygiene Laboratory, Metropolitan Life Insurance Co.; "Safety in the Quarry Industry," by H. F. Yotter, insurance supervisor and safety engineer, General Crushed Stone Co., and "What the Worker Thinks About Safety," by Glenn Gardiner, assistant to president, Forstmann-Woolen Co., Passaic, N. J.

Rock Asphalt Producers Organize

GEORGE RAPP, vice-president, Ohio Valley Rock Asphalt Co., was elected to the presidency of the newly formed Kentucky Rock Asphalt Institute at its organization meeting held in the Institute offices, Marion E. Taylor building, Louisville, Ky., on September 18. Mr. Rapp is a graduate civil engineer of Cornell University, and formerly was maintenance-of-way engineer for the Pennsylvania R. R. He has been connected with the Ohio Valley Rock Asphalt Co. since 1922. Mr. Rapp is a member of the American Society of Civil Engineers, the American Society for Testing Materials and the Association of Asphalt Technologists.

Walter Areta, vice-president, Natural Rock Asphalt Corp., will serve as vice-president of the Institute, and W. N. Bosler, assistant sales manager, Kentucky Rock Asphalt Co., was elected as secretary and treasurer. The following will serve as the first board of directors: Rodman Wiley, sales manager of the Kentucky Rock Asphalt Company; Phil McGovern, sales manager, Ohio Valley Rock Asphalt Co., and G. C. Appleton, chief engineer, Natural Rock Asphalt Corp., A. H. Hinkle, former deputy highway commissioner of Ohio and later superintendent of maintenance for the

George Rapp

Indiana State Highway Commission, was appointed executive director.

The purpose of the Institute will be to place at the command of officials and private citizens definite and reliable information and coöperation as to where, when and how both natural and processed Kentucky rock asphalt can be used to economical advantage in the surfacing of streets, highways, park roads, private driveways on estates, tennis courts, drill halls and other places where a smooth, resilient, non-skid surface is desired.

Mortar Cement Specialist

Kosmos Portland Cement Co., Kosmosdale, Ky., announces that it has added to its technical staff E. E. Berger, former chief chemist of the Century Cement Corp., Rosendale, N. Y. Prior to that Mr. Berger was with the U. S. Bureau of Standards and the U. S. Bureau of Mines. He is the author of numerous papers on lime, gypsum and cement.

Plant Destroyed by Fire

Malden Crushed Stone Co., Saugus, Mass., suffered loss of screening and crushing plant by fire on August 29. It was a timber structure with much of the screening and crushing machinery on top of the bins. Loss was about $50,000. Plans for rebuilding are about ready.

How Insulating Properties of "Voltuff" Were Discovered

Voltuff Products Co., New Plymouth, Ida., which, as previously noted in ROCK PRODUCTS, has been organized to exploit a deposit of volcanic ash, is the result of a curious experience. A local newspaper describes the "find" as follows:

"John Glass, who had been drilling for gas at Beacon Hill was using sagebrush for fuel in his furnace to heat the boilers. The process worked satisfactorily until winter set in and the boiler would not hold the heat during the cold weather. One of the cattlemen on Willow Creek had mentioned some peculiar material that he had seen while riding range in that section. Mr. Glass then investigated the formation and hauled some of it to his drilling site and built a wall around the steam boiler. This proved to

A. H. Hinckle

hold the steam during the sub-zero weather."

Unlike ordinary pumice and diatomaceous earth it is quite tough and is said to be a very good insulator for both heat, electricity and sound. It can be sawed to any structural shape. Apparently it is a cemented volcanic ash. "Voltuff" is a patented trade name.

View of Rockford Stone Co. plant from top of quarry face

Air-Floated Dolomite Dust Marketed Under Trade Name "MAG-A-CAL"

THE ROCKFORD STONE CO., owned and operated by H. O. Beerbower and C. E. Buel, has been producing crushed stone since 1925 at its plant on Ohio route 54 northwest of Rockford, Ohio. The original plant was operated until 1929, when a new plant was built to replace it. This plant is now being operated to supply crushed stone for road surfacing, road maintenance and aggregate for general construction. The owners operate as contractors as well as producers. Inasmuch as there is a ready wide-range market for fines, a new pulverizing plant was added recently. Construction of the new addition began in May, and the mill was put into operation in August. This new unit is one of the most modern and efficient small pulverizing plants.

The Deposit

The rock used in the crushing and pulverizing plants is a dolomitic limestone consisting of 55.45% $CaCO_3$, 44.15% $MgCO_3$, 0.30% silica and 0.10% silica aluminum oxide, iron oxide and moisture. Eight feet of overburden covers the deposit, which is being worked on a 30-ft. face. A ¾-yd. gasoline-driven Thew shovel loads the overburden into three 3-ton trucks, used to haul and dump it in an old abandoned quarry. Two International and one Reo trucks are used in hauling this overburden.

Blast holes are drilled to a depth of 33 ft. by a No. 2 Loomis well drill. The holes, which are 4¾ in. in diameter, are spaced 13 ft. 6 in. apart and 12 ft. back from the face. From nine to eighteen holes are shot at once, 4½-in. Trojan powder sticks being used.

The Crushing Plant

An Erie caterpillar steam shovel with a ¾-yd. bucket loads the rock into 2-ton trucks. Three of these Graham trucks haul the rock to the foot of the plant incline. A 2½-ton car is hauled up the incline on 36-in. gauge track by a Thomas hoist, and the rock is discharged into the primary crusher to be crushed to 2½ in. The primary crusher is a Wheeling 15- x 38-in. jaw crusher, driven by a 60-hp. Red-Band motor through a Dayton-Cog V-belt drive.

After being crushed, the rock goes by a bucket elevator to a home-made 3x6 ft. triple-deck, vibrating screen. Rock retained on the upper 1½-in. deck passes to a 2-ft. Symons cone secondary crusher, which is driven by a 30-hp. Westinghouse motor through a belt drive. The 1½-in. to 2½-in. size goes to a bin and the 1½-in. to ¾-in. size to another bin, or can be returned to the cone crusher. A second home-made, triple-deck screen, 2½x6 ft., sizes the ¾-in. stone to ¾-in. to ½-in., and ½-in. to ⅜-in. and minus ⅜-in. The oversize from the first screen, after recrushing in the cone crusher, goes to the same elevator to the second screen for sizing. The 3x6 and 2½x6-ft. screens are driven by a 5-hp. Westinghouse motor and a 3-hp. Westinghouse, respectively, through V-belt drives, and the elevator by a 10-hp. Westinghouse motor through a plain belt drive.

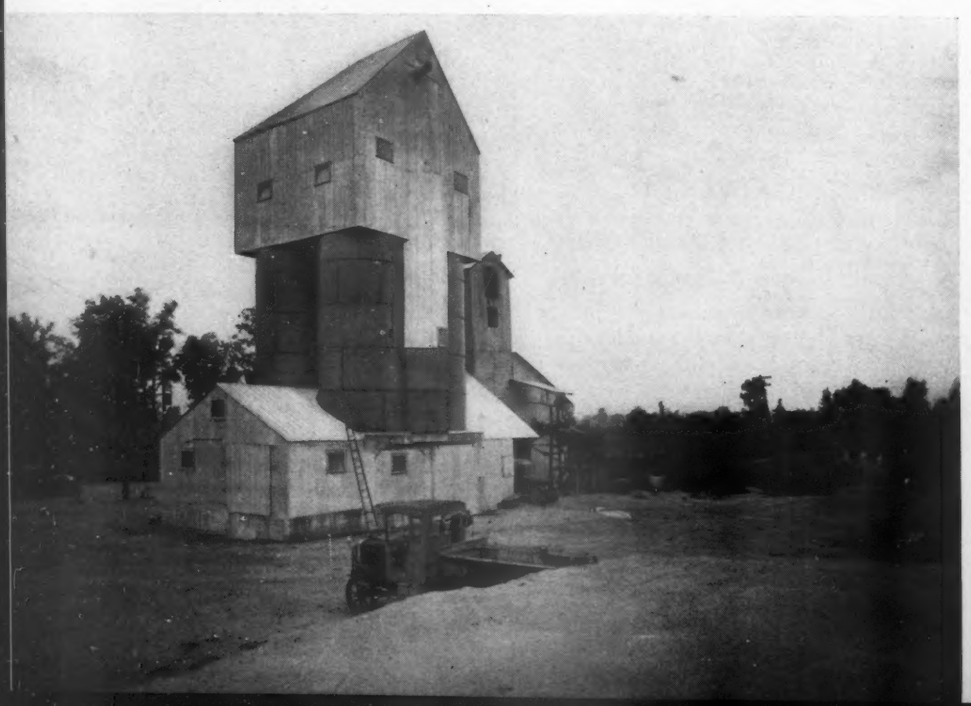
The plant is equipped with six wood bins 14x8x20 ft. high. A 3x6-ft. home-made vibrating screen, driven by a 10-hp. Westinghouse motor through a positive eccentric, is mounted outside the main plant for washing, when washed stone is required. Stone from the bins goes to this washing screen on an 18-in. conveyor belt, driven by the same 10-hp. motor. A Frederick 5-in. double suction pump driven by a 20-hp. G.-E. motor supplies 1150 g.p.m. under 30 lb./sq. in. for washing, through a 4-in. pipe at the screen. A 5-in Gould pump driven by a Hinckley 40-hp. gasoline engine is kept in readiness in case of power shutdowns, to supply water for the plant as needed.

Rock retained on the ⅛-in. screen goes directly to trucks to be hauled for market or stockpiled. The throughs go to a settling tank and are loaded into trucks by a home-made drag, to be disposed of or to be stockpiled.

A 70-ft. mast and cableway with a ½-yd. home-made bucket is used for stockpiling stone (road material). The bucket receives the stone from the bin through a 12-in. chute and is pulled by a Thomas hoist driven by a 15-hp. Westinghouse motor to a point above the stockpiling area and "tripped." About 10,000 ton can be stockpiled in this way.

New Pulverizing Plant

The new plant, for producing pulverized stone, is entirely of steel and reinforced-concrete construction, and is built next to



New pulverized stone addition: 15-ton auxiliary bin containing bag dust collector is shown between the two cylindrical bins

Pulverizer, from sacking platform

the bins of the old plant, forming one large plant. The new addition consists mainly of a Williams 4-roll pulverizing mill and dryer, cyclone dust collector and bins for storing the products. Rock is fed to the mill by a chain bucket elevator lifting stone from two pits. The two pits are located in the new unit, but adjacent to the old crushed stone bins. The pits are identical in size, each 6 ft. x 12 in. in place and 6 ft. deep. Stone below ¾-in. is dumped into these pits by gravity from the old bins or is hauled from stockpile by truck and dumped into the pits. Both pits feed to the lower end of the Webster chain-bucket elevator, which has 5x8-in. buckets. The elevator is 18 ft. high and is driven by a 3-hp. Lima electric motor through a Palmer Bee speed reducer. The elevator discharges into a 3600-lb. steel hopper which automatically feeds to the mill.

The Mill

The final products have a wide range of uses, depending on the fineness attained. The mill operates on the principle of air flotation and separation, and the stone is heated and dried while being pulverized. A 23-in. suction fan driven by a 50-hp. G.-E. motor is located above the cyclone collector at the top of the plant. Heat is supplied on the ground level by a home-made, hot-air furnace, built from an old boiler taken out of a steam shovel. The furnace consists of a fire-box and hot-air chamber and is fired by coke. The air is drawn by the fan through the damper of the furnace, where it is heated to approximately 200 deg. F., and then through the roller mill up to the fan above. The stone is heated and dried while in the process of pulverizing and separation. A return pipe carries the heated air back to the mill to be reused (now 160 deg. F.).

The mill operates on the principle that a certain amount of air forced through the mill will raise a particle of a given size. Consequently a vane adjustment is made on the fan when a different sized product is desired. Less air will be needed to separate and elevate the smaller particles, and vice-versa. The suction of the fan causes the particles (when they reach the desired fineness) to rise through a pipe above. The same fan causes a vacuum in the cyclone collector above, with the result that the product is forced into the cyclone and is now the finished product.

The Williams mill is driven by a 50-hp. G.-E. motor and has a capacity of 4 to 13 tons per hour, depending on the desired fineness. When minus 325 mesh (Whiting) is being run, the capacity is 4 tons per hour, and when coarser and coarser fines are being run, the capacity increases proportionately, to 13 tons per hour, when glass sand and agricultural stone is being run. The feed to the mill from the 3600 lb. hopper is controlled automatically by an electrical device.

The plant is equipped with four steel bins 12½ ft. in diameter and 27 ft. high, all set on a reinforced concrete base 27x27½ ft., 12 ft. above ground level. The bins are connected externally by a wooden framework as shown on p. 28 to form an additional bin of 100-ton capacity. Each of the steel bins has a capacity of 120 tons when level full. An additional bin of 15-ton capacity is provided, as shown, to take the discharge from the dust collector.

Storage Kink

A wood floor of the same size as the bin foundation (27x27½ ft.) rests on top of the bins with an 18-in. square trap door into each bin. As the pulverized stone is "sucked" up to the fan, it is swirled around and dropped, and the vacuum in the cyclone collector causes it to drop into the cyclone. The bottom of the cyclone tapers to a 14-in. square section for emptying the collector. The upper gate opens when there is sufficient weight on it and the stone passes to the second gate, which opens, due to the weight. The first gate has closed before the lower one opens, so preserving the vacuum in the collector. The discharge falls on a 12-in. belt conveyor, 10-ft. centers. The belt conveyor is fixed at the center and is equipped with rollers so that a man can push it to the trap door of either bin desired. The conveyor is home-made and is driven by a 1-hp. Lima motor through a Palmer Bee speed reducer.

When the pulverized stone from the mill reaches the fan, the finer particles, which do not settle, go to a Williams bag dust collector mounted in the auxiliary narrow 15-ton bin. The 40 bags empty into this bin. This dust is drawn and marketed.

Shipping

Each bin is equipped with two 9-in. square gates below for emptying directly into trucks or paper bags. A 9-in. square chute can be readily attached to either gate, to lead to the bags. The flow of material to the bags is controlled by a rotating circular

New pulverizing plant shown in relation to older stone-crushing plant

Crushing plant with new pulverizing mill in the background

Improvised hot-air heater for furnishing drying air to pulverizer. Below: Packing floor; the chute above can be connected to any bin gate

plate, and 100 lb. is packed in each burlap bag, and 80 lb. in paper bags, all bags being weighed on Fairbanks-Morse scales. The testing of the fineness takes place daily on the sacking floor. In addition to the bin storage, two carloads can be stored on the sacking floor.

At the present time five grades of fines are produced for five distinct markets. Agricultural stone for use in soil sweetening is pulverized to minus 80-mesh. Fertilizer filler, to be sold to fertilizer manufacturers, has a 20-80-mesh fineness. These two products are made in one operation, the finer product (agricultural stone) being separated by air and the coarser passing directly from the mill through a 9-in. pipe to the bucket elevator, which discharges through a 6-in. pipe into one of the steel bins above. The whiting has a fineness of minus 300-mesh and is used for paint fillers and in rubber manufacture. It is made in one distinct operation. Stockfood (minus 100-mesh) and glass sand (20-60 mesh) are made in one operation.

Special Features of Mill Installation

C. E. Hermann, Williams Patent Crusher and Pulverizer Co., has supplied the following additional details:

There are two very interesting features about this installation. One is the fact that it is grinding an extremely tough dolomite at a very low cost per ton. When grinding fine this mill uses 80 hp. and produces 3½ tons per hour to 99% through 325-mesh, which means that it is producing this material with a power consumption of only 23 hp. per ton.

Another interesting feature of this installation is that the 99% through 325-mesh is over 99.9% through 200-mesh, which means an extremely accurate separation.

Another unusual feature of this mill is the use of an inner cone tailings spout which produces a glass sand running between 20- and 80-mesh in addition to agricultural limestone. The actual figure is 1% on 20-mesh and 29% through 80-mesh. This material is produced at the rate of 4 tons per hour and an additional product of finely ground agricultural limestone running 83% through 100-mesh is obtained at the same time at the rate of 5 tons per hour. The latter is sold as 80-mesh agricultural limestone. With a total power expenditure of 90 hp. for both mill and fan, the milling cost per ton is only 10 hp.

Another feature of the mill that is worth mentioning is the use of ball and roller bearings throughout, including the journals. Some of these ball bearings are extremely large, being over 1-in. in diameter, and the whole mill is an extremely heavy duty product.

In General

All the steel used in the new addition has been fabricated by the Miami Iron and Steel Co., Dayton, Ohio. The plant is modernized completely and has a home-made electrically driven elevator for transportation between floor levels and modern office and shop at the plant. Agricultural stone is delivered directly to the farmers' fields. When shipment is to be made by rail, the stone is hauled to Rockford on trucks and loaded into cars on the Big Four railroad. The stone crushing plant has a capacity of 35 tons per hour and the mill can produce 4 to 13 tons per hour, depending on the fineness desired.

The Rockford Stone Co. advertises as "Manufacturers MAG-A-CAL Pulverized Limestone Products."

Bin arrangement (not to scale)

Good Publicity!

Olympic Portland Cement Co., Bellingham, Wash., is another of various cement companies, previously referred to in ROCK PRODUCTS, which are making good use of local newspaper publicity. The September 15 issue of the *Bellingham Morning Herald* contains several pictures of the plant, Adolph Krabbe, general superintendent, and a story telling what the Grand Coulee dam cement order means to the community; and what this plant organization has done for its employes and the industry.

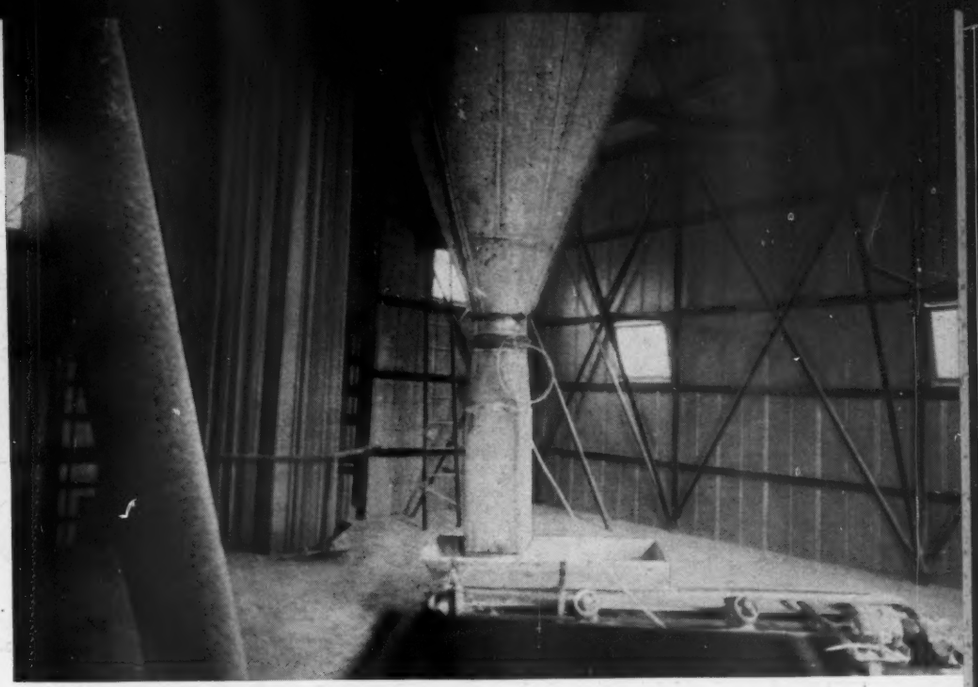
Uses Lime Kilns for Data on Blast Furnace Flux

Marble Cliff Quarries Co., Columbus, Ohio, has been a large producer of limestone for blast furnace flux for 75 or 80 years, and has made a scientific study of furnace requirements. These were described in detail by Paul C. Hodges, vice-president, at the recent Chicago meeting of the Iron and Steel Division, American Institute of Mining and Metallurgical Engineers.

He said: "One of our byproduct plants in which we make use of a considerable tonnage of the smaller stone is a modern, rotary kiln lime plant. The continual operation of this plant since it was built has taught us a great many things that should be of value to the blast furnace man in the matter of the rate of calcination of our particular stone. We have learned through our own experiments, and from Prof. D. J. Demorest of Ohio State University, that complete calcination of our standard size flux stone, 4 to 1½ in. plus, takes place in four hours at a maximum temperature of 970 deg. C. We find that to some of our flux users these data have been very helpful in the operation of their blast furnaces as they know that all the CO_2 gas has been driven off before the stone reaches the combustion zone.

"We have noticed in the burning of our lime, and again in open hearth use, that the Columbus limestone has the peculiar characteristic of retaining its original form or structure until the final melt, causing it to break down very gradually.

"A fairly uniform analysis of the stone is of great importance to us in our burnt lime, and of course is of prime importance to the blast furnace operator. We keep a continuous record of each stratum of the quarry, and control the average analysis of the stone sent to the crushers through careful placement of our leading shovels in different sections of the quarry, and watching closely the tonnage sent to the crushers by each shovel. The minus 2¾-in. stone sent to the lime plant is constantly sampled and analyzed, thus giving an immediate check on the flux stone."

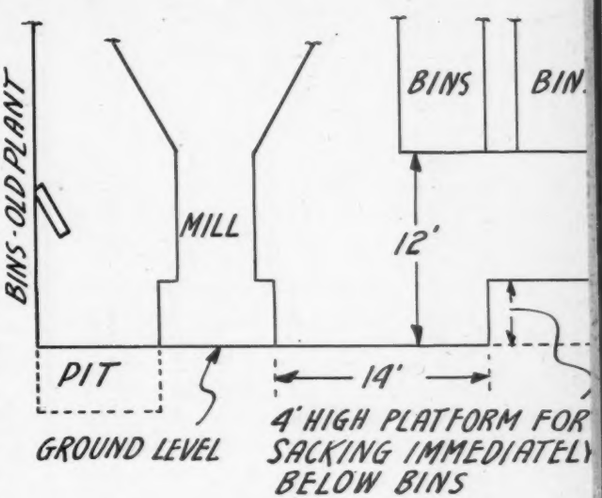


Floor over bins, showing movable conveyor to load collector dust to any bin

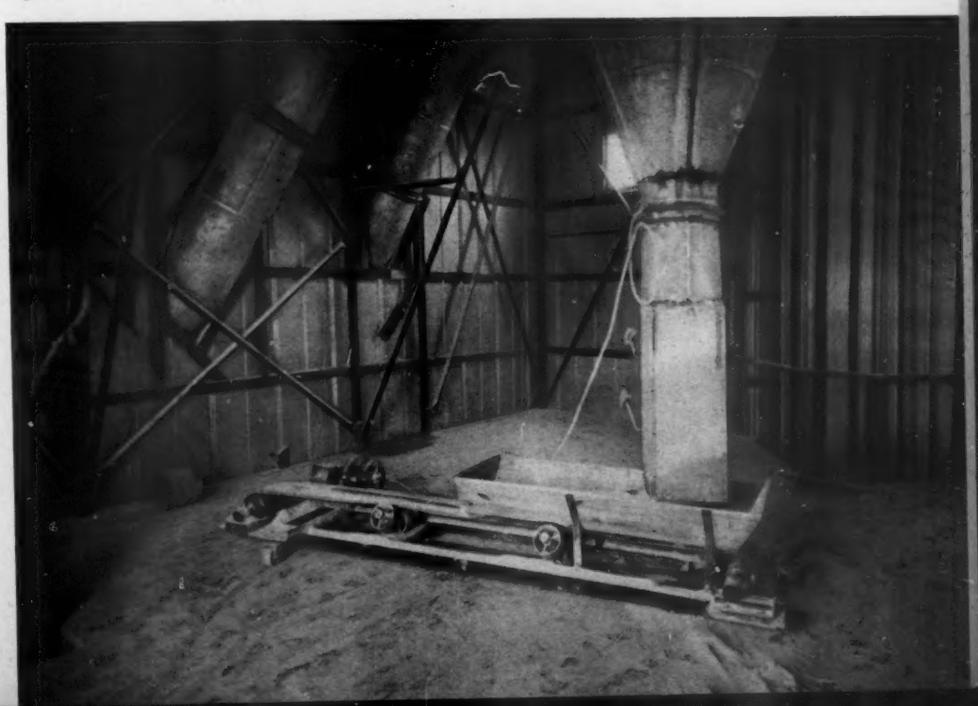
Publication of "Crushed Stone Journal" Resumed

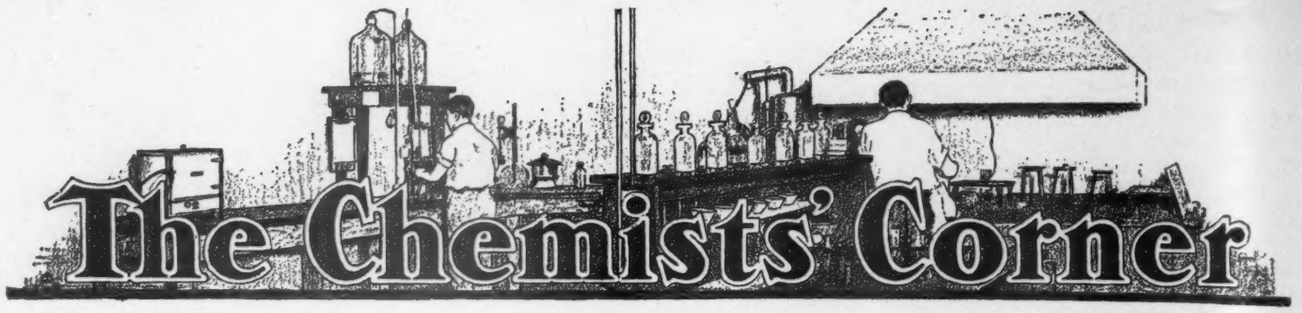
OCTOBER saw resumption of publication of the *Crushed Stone Journal* as an official mouthpiece of the National Crushed Stone Association. Like its companion, the *National Sand and Gravel Bulletin,* it is gotten out in mimeograph form—and, while it is not so stated, as in the case of the *Bulletin,* it is evidently for distribution to members of the association only.

The October issue is devoted exclusively to a review of the legislation adopted at the last (maybe it would be a good thing if it were "the last," but "latest" is probably meant) session of Congress, submitted by the Mineral Aggregates Institute. It will bear careful reading and re-reading by members of the industry, and if the Institute serves no other purpose it will have accomplished much in making the members of this industry familiar with developments at Washington.



Sketch of mill and bin arrangement. Below: Another view of movable conveyor: Rockford Stone Co. plant





Air Separator *PERFORMANCE*

By Raymond Wilson
Conservation Engineer, Portland Cement Association

Summary

THIS PAPER points out the inadequacy of existing efficiency formulas for defining characteristics of air separators used in clinker grinding and describes a method of portraying performance in relation to the complete range of particle sizes involved. Effects of some operating and design variables are shown. The analysis of separator performance shows that air separation in itself has little effect on the grading of the finer portion of the cement. The grading of the coarser portion is so affected that the 200-mesh fineness has no value as a basis for comparing effects of open and closed circuit clinker grinding.

It is believed that the methods described here will further the better understanding of the function of the air separator and give information not previously available as to its capabilities and limitations.

—THE AUTHOR.

THE EXTENSIVE USE of air separators in the cement industry has prompted an examination of the operating characteristics of some commercial machines used with finish grinding mills. Understanding of the behavior of separators is of particular importance in clinker grinding because of the influence of the grading of the fine sizes on the properties of cement.

Discussions relative to methods of calculating the efficiency of classifiers have appeared in Rock Products. Catlin[1] gives a formula which is in common use in the cement industry. By this formula, the efficiency of the separator is the ratio of fine material recovered in the fine product to the total fine material fed. Newton[2] gives a formula generally used in the metallurgical field which is in effect that given by Catlin with added factors which penalize the separator for recovery of oversize in the fine product. In cement clinker grinding both formulas would generally be applied to 200-mesh fineness, though any desired size can be considered as marking the dividing line between fine and coarse material.

These formulas are very useful in the day by day use of a separator. For some purposes they give all the information that is needed, but they give a very incomplete picture of the nature of the separation. The common weakness of both formulas is that they encourage the assumption that separation and recovery in the fine product are equally complete throughout the range of sizes designated as fine material. These formulas must be applied to some specific particle size. When the separator is operating on cement clinker, efficiency formulas give misleading indications of mill and separator performance, due to the fact that the quantity of coarse material present is not an adequate measure of the properties conferred by grinding. On the whole, reliance on the common efficiency formulas has complicated studies of the use of separators in grinding and has doubtless retarded the improvement of separator design.

Attempts have been made to apply the relations between particle size and settling rate to studies of separator performance.[3, 4] These relations are of great importance in connection with test elutriators where the separation is made under conditions of straight line air flow and continued until the residue retains practically no fine material. In commercial separators of the types considered here, neither of these conditions holds; the rising air current has a motion which is turbulent and cyclonic and the feed falls through the air stream with only a brief period of contact. The first condition causes coarse particles to carry over to the fine product, while the second brings about retention of fine material in the coarse product.

It is apparently a hopelessly complicated task to account for turbulence, centrifugal forces and incomplete separation by theoretical studies or the use of general laws. Nevertheless, any machine has certain inherent characteristics which can be experimentally determined. Furthermore, if these characteristics are properly defined, they will show some kind of regular variation with changes in operating conditions.

Method of Rating Performance

It is the purpose of this article to present an improved method of describing air separator performance which defines the separation characteristics throughout the whole range of particle sizes affected. It can best be understood from a sample calculation.

Fineness data from a test on a separator are given in Table 1. Fineness determinations include air elutriation[5] and sieve tests on the feed to and the tailings and fines from the separator. These fineness data are used, first, to calculate the distribution of the feed between the fine and the coarse product. The quantity of fine product is given in the last column, the formula for the calculation being given at the head of the column. The formula is applied to fineness at various sizes. The average of the values marked with an asterisk is used for subsequent calculations.

Clinker is fed to the separator at the rate of 150 bbl. per hour. The fineness data in Table 1 indicate that the fine product is 46% of the feed, or 69 bbl. per hour; the tailings then amount to 81 bbl. per hour. When these quantities are known, it becomes possible to convert the fineness data to show the number of barrels per hour in each individual size range in each of the material streams. These converted data are given in Table 2 and shown graphically by the distribution curves in the upper part of Fig. 1.

[1] Formulas applicable to air separation. A. W. Catlin, Rock Products, 34, No. 25 46-8 (December 5, 1931).

[2] A study of classification calculations. Harry W. Newton and William H. Newton. Rock Products, 35, No. 16, 26-30 (August 13, 1932).

[3] Air separation methods used in fine grinding of rock products; Edmund Shaw. Rock Products, 30, No. 21, 59-61 (Oct. 15, 1927).

[4] Classifying materials by air separation; E. C. Blanc. *Concrete* (Mill Section) 33, No. 5, 99-103, No. 6, 98-102 (Nov., Dec., 1928).

[5] Air elutriation fineness results given in this paper were obtained on an instrument of the Pearson type. Its calibration by microscopic methods is in close agreement with Stokes' law. Stack velocities in cm. per sec. are $0.0094d^2$ "d" being the particle size in microns. Sieve tests were made with sieves of the Tyler standard screen scale series.

TABLE 1—FINENESS OF SAMPLES

Size	Fineness—Cumulative Pct. Finer Than Size Shown: Feed (a)	Tails (b)	Fines (c)	Pct. of Feed Sent to Fine Product $\left(\frac{a-b}{c-b} \times 100\right)$
10 microns..	9.6	3.1	16.0	50
20 microns..	18.0	5.0	32.6	47*
30 microns..	27.5	7.0	52.0	46*
45 microns..	34.2	8.0	64.2	47*
200-mesh ...	45.6	13.9	86.8	44*
100-mesh ...	59.9	29.1	98.4	44*
48-mesh ...	74.4	56.7	99.9	41
28-mesh ...	87.6	80.9	100.0	35
14-mesh ...	97.1	95.2	...	..
8-mesh ...	99.8	99.8	...	*Av. 46

Feed rate: 150 bbl. per hr.
Tailings: 150 × .54 = 81 bbl. per hr.
Fines: 150 × .46 = 69 bbl. per hr.

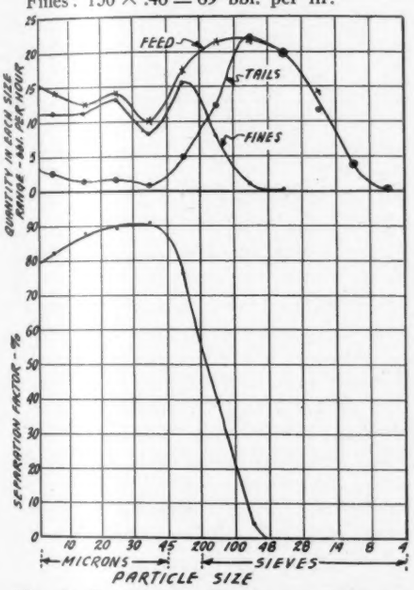


Fig. 1—Separation diagram and corresponding separator performance curve

In this figure, the quantity of material in a given size range is plotted against the average particle size in that range, and the plotted points for each material connected by curves. The size scale is an arbitrary one in which the air analyses and sieve separation points are spaced at equal intervals and the mid-point of each interval taken as the average size. While appearing somewhat artificial, this method of plotting these data is a convenient means of visualizing the concentration of material in various sizes.

Distribution curves, plotted on the barrels per hour basis as in the upper part of Fig. 1, portray the separation quantitatively over the whole size range. They show that the fine product receives most of the 0-45 micron material, while the material coarser than 48-mesh is completely recovered in the tailings. In the zone between 45 microns and 48-mesh, the separation is less positive than in the regions on either side.

The separation may be regarded as a process in which a mixture of various components is treated. Each component reacts to the treatment in its characteristic manner and is recovered in the finished product in quantity dependent on its nature and the nature of the treatment. The components are the various sieve and air analyzer fractions comprising the feed. The yield of each component in the fine product of the separator may be expressed as the percentage ratio which it bears to the maximum possible yield of that particular size. This is calculated from the data in Table 2 by dividing the quantity in a given size range in the fine product by the total quantity in that size range in the fine and coarse products combined. In this paper, the per cent recovery of each individual fraction in the fine product is referred to as the "separation factor" for that size range. The separation factors for the various size ranges are given in the last column of Table 2.

TABLE 2—CALCULATION OF SEPARATOR PERFORMANCE

Size Range	Quantity in Size Range—Bbl. Per Hour: Feed (a)	Tails (b)	Fines (c)	Totals (b + c)	Separation Factor $\left(\frac{c}{b+c} \times 100\right)$
Total	150	81	69	150	..
0-10 microns..	14.4	2.5	11.0	13.5	82
10-20 microns..	12.6	1.5	11.4	12.9	88
20-30 microns..	14.3	1.6	13.4	15.0	90
30-45 microns..	10.0	0.8	8.4	9.2	91
45 mic.-200 mesh	17.6	4.8	15.6	20.4	76
200-100 mesh...	21.5	12.3	8.0	20.3	39
100- 48 mesh...	21.8	22.4	1.0	23.4	4
48- 28 mesh...	19.8	19.6	0.1	19.7	0
28- 14 mesh...	14.3	11.6	0	11.6	0
+ 14 mesh...	4.3	3.9	0	3.9	0

The separation factor for each size indicates the distribution of material of that size between the fine and the coarse product. The relations among the separation factors for different sizes of particles define the characteristics of the separator for the particular conditions of the test. These relations are more clearly shown if the separation factor is plotted against particle size as shown in the lower part of Fig. 1. The curve connecting the plotted points shows that there is a continuous variation in per cent yield with particle size, relatively high for the 0-10 micron range, increasing somewhat over the 10-45 micron range and decreasing sharply in the range coarser than 45 microns. Efficient recovery of fines is denoted by high values for points defining the left-hand portion of the curve, while a steep slope of the right-hand portion indicates selectiveness or close separation.

Any separation on the basis of particle size can be described by curves of the general type shown in the upper and lower parts of Fig. 1. The upper diagram gives more information, indicating the quantity and grading of the feed and products. The curve of the lower diagram lends itself more readily to comparisons of performance of various separators or of the same separator.

Operating Conditions and Design

The shape and position of the performance curve depend on the design of the machine and on the operating conditions. The effects of varying a number of the operating conditions have been experimentally determined. For the sake of brevity, they are shown in Fig. 2 by a series of performance curves, without including the complete fineness data on which they are based.

Feed Fineness. The fineness of the feed has some effect on the performance of the separator. From the results of several tests it appears that larger percentage yields of each size are obtained from a coarse feed than from a fine feed. The curves in Diagram A of Fig. 2 are typical of the effect of feed fineness, the feed rate and separator setting being closely similar in both cases. From these curves it appears that variations in feed fineness will result in similar but smaller variations in product fineness.

Feed Rate. Apparently the performance of the separator is affected to a rather slight degree by fairly wide variations in feed rate and is therefore not illustrated in the diagram. This observation may not apply to very high or very low feed rates.

Rate of Air Circulation. One method of causing a separator to produce a finer or coarser product is to adjust the rate of air circulation. This may be done by changing the fan speed, opening or closing the main control valves or by other means. The effects of fan speed and of adjustment of main valves are illustrated in Diagrams B and C of Fig. 2. A decrease in the rate of air circulation causes the performance curve to assume a lower position, without particular change in shape. The decreases in the separation factors are about equal over the whole size range. Smaller quantities of coarse material are carried over into the fine product, but only at the expense of decreased recovery of fine material, and hence increased retention of fine material in the tailings. These tests did not include measurements of air velocities in the separator. The observed variations in performance cannot, therefore, be referred directly to rate of air circulation.

Effects of Design. Performance curves for separators made by three different manufacturers are given in Diagram D of Fig. 2. It is not possible to deduce from these tests what details of design and construction are responsible for the differences in performance among these machines. Separator A is less selective than the other two and separator B, while about as selective as separator C, makes its separation at a larger size. Recovery of fine material by these three machines is somewhat different, but as indicated above, could probably be brought to about the same point by control of air circulation without particularly affecting the selectiveness.

There is reason to believe that selectiveness can be improved by placing beater blades on the shaft in the inner chamber of the separator above the distributor plate. The theory of these blades is that oversize particles, lifted by turbulence in the air stream, impinge on the blades and are thrown out of the rising air stream. It is significant that the machine having the most selective separation, as shown in the diagrams, has these beater blades. By means of improved selectiveness, yield of fine material has been maintained at a fairly high point while carry-over of coarse material has been decreased. The result is a greater fineness in the fine product without a corresponding retention of fines in the tailings.

Summarizing the foregoing discussion, it appears that adjustments involving only changes in rate of air circulation bring about changes in the separation which may be represented by variations upward or downward in the position of the performance curve. Changes represented by variations in the shape of the curve appear to depend on design of the separator. Selectiveness is largely a built-in characteristic while completeness of recovery of fines is dependent on adjustment of air circulation rates also.

Uses of Performance Curve

Once the characteristics of a separator have been determined, the methods and principles set forth above provide a guide to means which are most likely to accomplish any desired change. With a known performance curve the effects of a change in feed fineness can be estimated. By reversing the calculations shown in Table 2 and adjusting the values of separation factors in the directions indicated in Fig. 2, fineness and yield of the products can be calculated. These calculations are not precise predictions of results under new conditions but give better indications than could be obtained from the earlier efficiency formulas. This type of calculation can be applied where a feed stream of fairly constant fineness is to be classified.

In the common hook-up where tailings are returned to the mill which discharges to the separator, the separator performance affects the amount of circulating load and hence the fineness of the mill discharge. In the final analysis, however, it is the mill performance which determines the fineness of the product. Because mill performance is seldom known with the required precision, the methods described above cannot ordinarily be adapted to the advance calculation of quantities which will be carried as circulating loads in closed circuit grinding. The methods of analysis here developed do show how to avoid recirculation of excessive amounts of material already fine enough.

One consistent characteristic of air separators, as reflected in all the tests, is the tendency for recovery of 0-10 micron material to be less complete than is the recovery of the sizes between 10 and 30 or 45 microns. Test separations of mill products ground in open circuit are likely to result in separator fine products deficient in fine flour. In closed circuit operation, however, the separator tailings and therefore the mill product will contain a corresponding excess of this fine flour and the separator product will have about the same grading in the range below 45 microns as the product of open circuit operation of the mill.

It has generally been observed that a higher 200-mesh fineness is necessary in a closed circuit product than in an open circuit product of the same clinker. The analysis of separator performance given here is complete explanation of this observation. The grading in the finer sizes is the result of action of the mill on the clinker and has not been affected materially by the separation. On the other hand, the grading in the coarser sizes is determined by the separator rather than by the mill. In general, a separator product will contain less material coarser than 200 mesh than a mill product having the same content of fines. This simply means that the 200-mesh fineness is not an adequate basis for comparing open and closed circuit grinding of cement clinker. The more selective the separator, the more unreliable a separation on that basis.

Where a very fine product is desired studies of separator performance by this method might well include data on fineness at 60 microns; inclusion of these data would define more precisely the separation at a point of considerable interest in the production of cements finer than standard.

The air elutriator used in these tests is capable of giving results of a high degree of consistency among themselves. However, few laboratories are equipped with air elutriators having the requisite precision for making tests of this kind. The recently developed Wagner turbidimeter could probably be adapted to provide comparable information on separator performance.

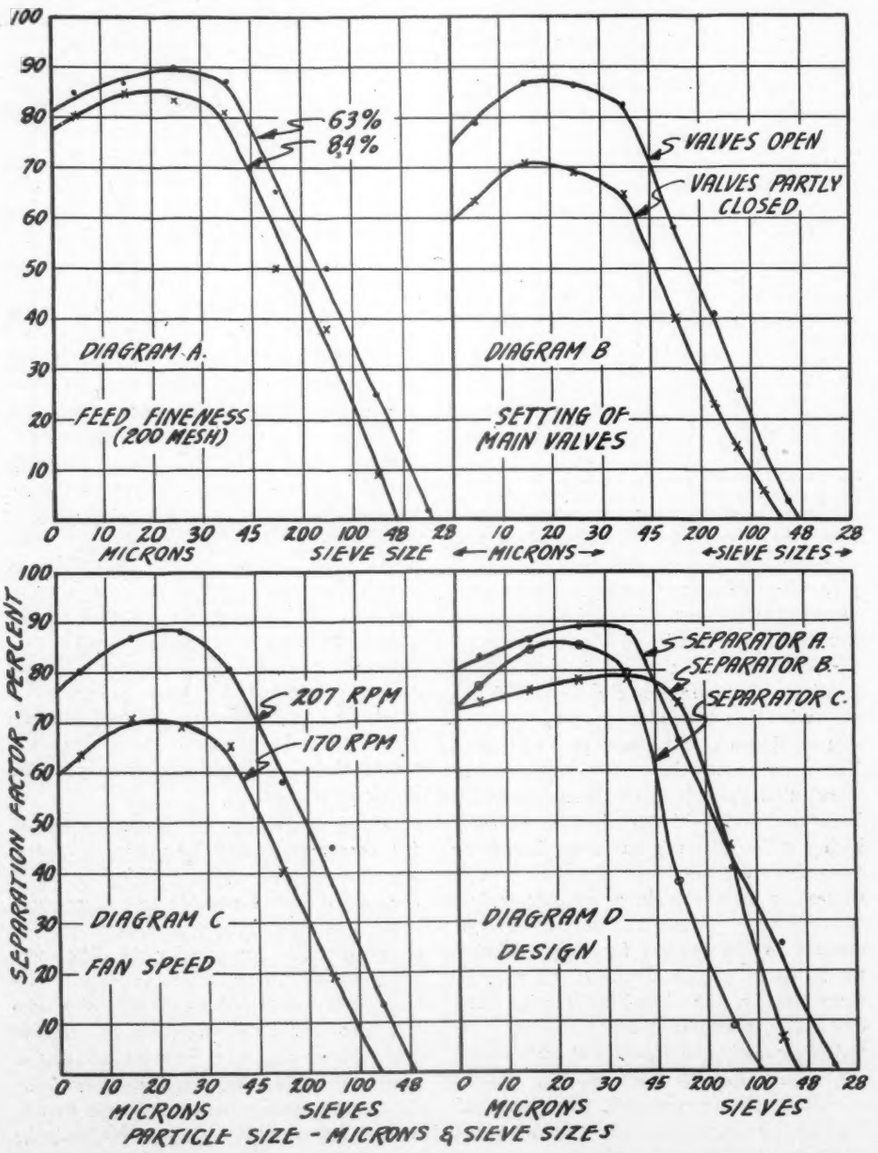


Fig. 2—Effects of some variables on separator performance—Separation factor for each size is the fine product yield of that size expressed as the percentage ratio to total amount of that size in both coarse and fine products

Bids Received—Contract Prices

Fort Wayne, Ind., county commissioners let contracts for 3000 tons of gravel to Erie Stone Co., Fort Wayne, and Meshberger Bros., Linn Grove, at $1.34 per ton delivered on the road.

• • •

Grand Coulee Dam, Wash.: Contracts awarded six Washington cement mills for 4,220,000 bbl. as follows: Superior Portland Cement, Inc., Concrete and Seattle, 2,000,000 bbl.; Olympic Portland Cement Co., Ltd., Bellingham, 770,000 bbl.; Lehigh Portland Cement Co., Metaline Falls, 600,000 bbl.; Northwestern Portland Cement Co., Grotto, 450,000 bbl.; Spokane Portland Cement Co., Irvin, 400,000 bbl. As noted in the September issue of ROCK PRODUCTS, the f. o. b. mill prices are practically identical—approximately $1.38 per bbl., except the Spokane company, which nets $1.53 because of a most favorable freight rate. In commenting on the award, E. P. Lucas, president of Superior Portland Cement, Inc., said: "The price which we will receive for this cement is equivalent to $1.8796 per bbl. in cloth sacks, and is the price f.o.b. cars our mills at Concrete and Seattle. It is a modified type of cement, made particularly for the construction of large dam projects. It is similar in quality to that supplied the government for the Boulder Dam and the Tennessee Valley Authority."

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Lincoln, Ill.: Bids for 19,000 cu. yd. of gravel for Oran township roads were I. D. Lain, Downers Grove, Ill., Section 1, $1.39 per cu. yd.; section 2, $1.21 per cu. yd.; both sections, $1.15 per cu. yd.

George Hoffman Construction Co., Springfield, Ill., Section 1, $1.45; section 2, $1.27; both sections, $1.19. Bids were rejected.

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Galesburg, Ill.: County highway department let contract for 35,000 tons of gravel to Western Sand and Gravel Co., Spring Valley, Ill., at $1.64 per cu. yd. delivered on the road.

• • •

Oklahoma City, Okla.: City authorities accepted bid of Dolese Bros. for ready-mixed concrete at $6.85 per cu. yd., after debating building of municipal concrete plant. City engineer reported materials alone would cost the city $6.31 per cu. yd. and an investment of more than $30,000 would be required.

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Schenectady, N. Y.: City authorities awarded contract for 5000 tons of "rubberized" amiesite (crushed stone-asphalt mix) to Cushing Stone Co. at $7.75 per ton.

• • •

Rock Island, Ill.: City authorities received bids on 5500 bbl. of cement: Milan Sand and Gravel Co., $2.40 per bbl., Rock Island Sand and Gravel Co., $2.47 per bbl.

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Pontiac, Ill.: Churchill Gravel Co., Pontiac, awarded contract for graveling 24 miles of road for $41,859.53.

Worcester, Mass.: City authorities received bids on three sizes of crushed stone, Pandolf Co., Sterling, Mass., $1.49 per ton, all sizes or grades; Worcester Trap Rock Co., $1.45, $1.45 and $1.75; Massachusetts Broken Stone Co., Waltham, and General Crushed Stone Co., from local bins, $2.15 for all sizes. Officials claim they can buy in open market for 95c per ton.

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Schuyler, Neb.: Bids of 50c per cu. yd. at the pit for 1500 cu. yd. or more of road gravel were submitted by operators of the two local pits, Jess L. Woods and Mentzer & Son, to the county commissioners. When the bidders expressed willingness to divide the contract the commissioners agreed to purchase half of the required amount from each of the two bidders.

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Nashville, Tenn.: Franklin Limestone Co. awarded contract for 12,000 sq. ft. gypsum wall board for temporary court house at $45 per M.

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Gibson City, Ill.: Bids for furnishing, hauling and spreading screened and crushed gravel for roads: Prothero & Willis, Bloomington, $1.00 per cu. yd.; W. M. Gibson, Bloomington, $1.05; Lehigh Stone Co., Kankakee, $1.00; M. Wagonseller, Henry, $1.03; Willis Rowe, Bloomington, 98c.

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Springfield, Ill.: City council awarded contract for 15,000 tons of rip-rap to Columbia Quarry Co., St. Louis, Mo., for $1.55 per ton delivered.

• • •

Lincoln, Ill.: Bids received for graveling six miles of road: George Hoffman, $1.67 per cu. yd.; R. A. Cullinan, $1.79; Lincoln Sand and Gravel Co., $1.82. Bids were rejected.

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Vicksburg, Miss.: U. S. War Department let contract for 45,000 bbl. of portland cement to Monarch Cement Co., Humboldt, Kan., at approximately $2.61 per bbl. delivered to government spur track, Greenville, Miss.

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Jacksonville, Ill.: County commissioners awarded contract to Springfield-Pekin Sand and Gravel Co., Pekin, Ill., for furnishing and spreading gravel on two miles of road at $1.85 per cu. yd.

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Chicago, Ill.: County commissioners disgruntled by two sets of identical bids for 21,000 tons of crushed stone, taken a week apart. Nine bids were offered each time at $1.92 per ton, and one at $1.74. The first time the $1.74 bid was received it was rejected because of doubt that bidder could deliver.

• • •

Quincy, Ill.: Missouri Gravel Co., Moline, Ill., low bidder on seven state-aid county gravel roads at prices ranging from $1.60 to $2.28 per cu. yd.

New Philadelphia, Penn.: Harold Baker and Curtis Meredith awarded contract for 600 tons of pea gravel, f.o.b. job, at 88c per ton.

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Chicago, Ill.: Dearborn Material Co. awarded contract for 21,000 tons of crushed stone at $1.74 per ton, f.o.b. job (street repairs). Nine other bids identical, $1.92.

• • •

Syracuse, N. Y.: Cummings Supply Co. bid $2.39 per bbl. on cement for relief projects; nine other dealers bid $2.54; one $2.40.

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Springfield, Ill.: R. A. Culliman bid $1.81 per cu. yd. for graveling half mile of road in Logan county; Lincoln Sand and Gravel Co., Lincoln, Ill., bid $1.82½.

• • •

Piqua, Ohio: Marble Cliff Quarries Co., Columbus, Ohio, awarded contract for 500 tons of lime for water treatment plant at $8.10 per ton delivered.

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Chicago, Ill.: Consumers Co. awarded contract by WPA for 177,500 tons No. 1 binder crushed stone at $1.30 per ton; 175,000 tons of No. 2 ashphalt sand at $1.10 and 22,500 tons limestone dust at $1.75. All prices f.o.b. job.

• • •

Advance in Price

New York City: The price of fluorspar has been advanced $1.50 a ton to $10.00 effective immediately. This is the third advance in fluorspar this year, a $1 per ton mark-up having been announced around July 15, the other two in October.

Railroads Fight Exceptions

RAILROADS operating in Alabama recently filed a petition with the Interstate Commerce Commission seeking an investigation with respect to the Alabama Commission's refusal to allow intrastate increases in rates on certain commodities, such as limestone, sand, gravel, and paving or road-surfacing material. The railroads complain that the failure to increase these rates shows preference to intrastate shippers over interstate shippers.

Similar protests have been filed by the railroads in Kentucky, where intrastate surcharges allowed by the Kentucky Commission excepted bituminous rock, asphaltic limestone, sand, gravel and crushed stone.

No Exemptions from State Royalty

OREGON has a state royalty tax of 10c per cu.-yd. on sand and gravel removed from navigable streams. Federal agencies, counties, cities and contractors on state highways have been exempt. Recently the state land board cancelled all such exemptions. The public schools of the state have been the sufferers.

Hints and Helps for Superintendents

Road scraper clears the way for trucks

Road Scraper Keeps Quarry Floor Clean

WHEN a quarry operation is changed from industrial track haulage to the use of truck, a road scraper has been found by enterprising operators to be a worth-while investment.

Constant blasting and scattering of small rocks over the road bed lessen the normal life of truck tires and no cheaper or better method has been found than to remove the rocks with a light-weight road scraper.

At the quarry operated by Graham Bros., Inc., on Catalina Island, a Fordson tractor has been equipped with a No. 455, Nadfield-Penfield Steel Co. road scraper as shown in the illustration. This tractor easily negotiates the steep grades that are a feature of the district.

Welding Salvages Rock Crusher

By W. E. Archer,
Monterey Park, Calif.

BY MEANS of welding, an interesting piece of salvaging was recently accomplished on a Gates type 3D Allis-Chalmers rock crusher. A view of the completed job is shown. The job consisted of rebuilding a broken corner from the base of the crusher.

The break occurred at a vital point in the base, being across the corner containing two bolt holes necessary for use in securing the crusher to its foundation. As the broken piece had been lost, it was replaced by building in a section, which was done by a process of welding on two pieces of steel plate. The procedure followed in doing this job was to chip the edge of the casting smooth and place a piece of ordinary strap iron against the edge; through this were drilled holes for studding into the casting. Holes were likewise drilled in the edge of the casting, into which ⅝-in. and ¾-in. cap screws were inserted about 3 in. and left protruding for the studs.

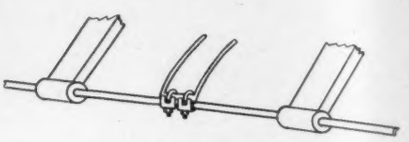
When the stud bolts were all inserted, welding followed by laying the first bead of welded metal in around the studs and the piece of strap iron. After this operation was completed, the edges of the plates forming the missing corner were welded to the strap iron. As the casting was 2½ in. thick, it was deemed not necessary to use plates of sufficient thickness to equal the original thickness of the casting, so two pieces of ½-in. plate were used, and an outside edge filler was welded in to fill out and finish the side edges.

By employing electric welding on this job, no preheating of the casting was necessary, ordinary caution being exercised by frequently shifting from one area to another during the welding in order to avoid an excess of heat in any one area of the job at a time, and thus eliminate the chances of resultant pent-up stresses within the metal. The total cost of this repair job did not exceed $40, and this saved an expenditure of several times this amount for a new casting. The job was completed in about eleven hours, the welding being done by and under the supervision of L. R. Luecke, welding foreman of the Prow-Leffler Co., El Monte, Calif., which concern specializes in the repairing of rock crushers and heavy highway maintenance equipment of all kinds.

Emergency Repair to Belt Shifter

By Charles Labbe,
Goldfield, Nevada

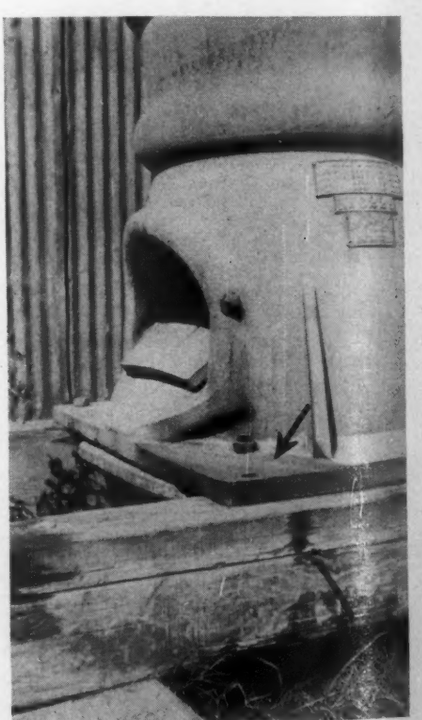
THROUGH some accident, the belt shifter on a tight-and-loose pulley was broken. The belt guiding fingers were of cast iron and none on hand to replace them; the machine was needed and to take them to the welder, or forge a pair, would have taken more time than the contractor was willing to spare.



Home-made belt shifter

An emergency shifter was made of a piece of ½-in. round iron, bent in a vise and fastened at the proper angle to the shifting bar with two common cable clips.

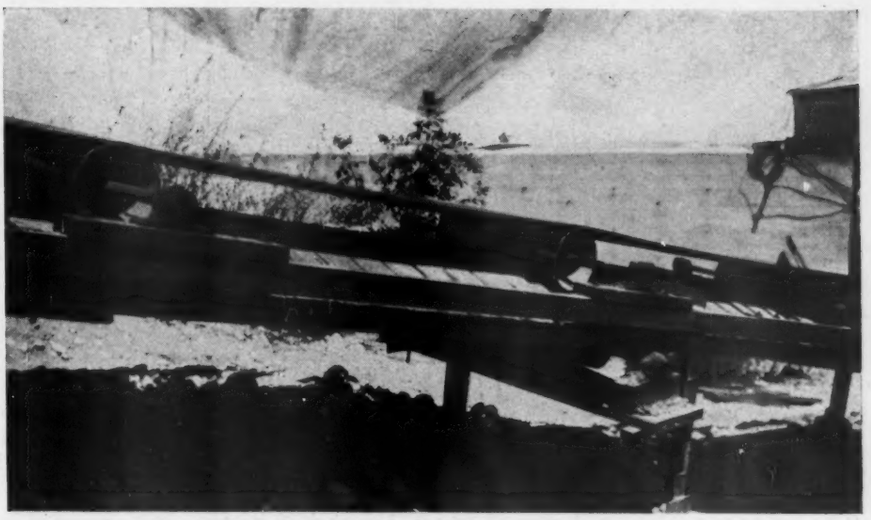
Without loss of time, this emergency repair lasted so well that later on when the repair parts were received hardly anyone knew of their necessity.



Arrow shows welded corner of crusher base plate

Protection for the Return Belt

CONVEYOR BELTS placed on a slope are likely to spill a certain amount of the material because gravel and stone will roll down the belt and off to one side. When such material falls or is blown by the wind on the inside surface of the return belt, and is carried around the tail pulley, considerable damage may be done to the belt. To eliminate this trouble, the Janesville Sand and Gravel Co., Janesville, Wis., has built a covering for the under belt along the entire length of its sloping conveyor structures. The particular feature of this cover for the return belt is its shape for it slopes downward to both sides from the center of the structure, instead of being built horizontally across the structure. This shape causes all the stones that may fall upon it to be thrown off, so that they do not roll down the cover to the tail pulley and injure the belt. The cover is made on a framework of three 2x4-in. timbers, one for the center and one for each edge, with the covering of boards placed between. The whole is supported by the conveyor framework.



Protection for underside of conveyor belt

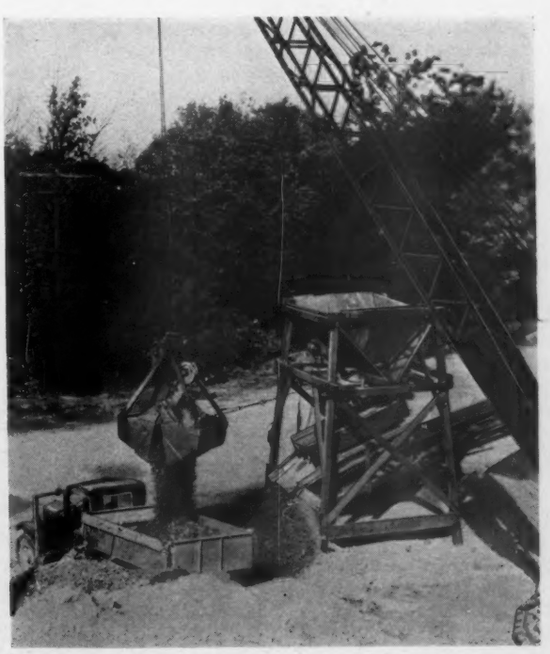
Uses Vibrating Screen to Overcome Handicaps

THE accompanying two photographs illustrate how one producer of sand and gravel in the vicinity of Milwaukee was able to overcome his operating handicaps and bring his costs down so he could make a profit.

The usual method of operating this gravel pit was by the use of a centrifugal dredge pump, requiring a 200-hp. motor to operate it. In working this pit the producer found that his deposit contained from 55 to 60% sand, most of which was a drug on the market. Furthermore, as the distance between pump and the plant proper increased, the pump failed to pump the large stone and only picked up the fine material, of which he already had an excess in the stock piles. This condition, combined with the existing high power demand charge in connection with the pump motor, made his operating cost prohibitive.

A new, more profitable method and arrangement of handling his material from the deposit was developed, as shown in the two photographs. This arrangement consists of an Allis-Chalmers 3x8 ft. double-deck, "Aero-Vibe" screen suspended from framework, with a hopper built above it, a small apron feed underneath the hopper, and a belt conveyor below the screen. The top deck is equipped with coarse mesh and acts as a scalper on account of the deposit containing stone 6 in. and down. The lower deck has rectangular openings ⅜ in. wide. The sand or minus ⅜-in. material discharges on the belt conveyor which deposits it over the bank at the edge of the pit. The screen itself is driven by a 2-hp. motor and the belt conveyor and apron feed together only require a motor of similar size.

The material obtained from the pit is dumped into the hopper by a 1-yd. bucket, gasoline-operated, clam-shell mounted on a crawler. In its all-day operation this clam-shell also has two other duties to perform. It spreads the sand that builds up at the end of the conveyor, and also puts the reclaimed stone from the screen into trucks that take it to the crusher and washer plant. Filling the hopper for the screening operation takes two-thirds of the time. Reclaim and sand removal take the remaining third. Even with the rather crude unit shown, the producer obtained about 50 tons of material.



Views of screen-and-hopper unit

LETTERS TO THE EDITOR

Production, Sale and Use of Fine Sand

THE EDITOR: This is a copy of a letter to one of your subscribers who sought further information along the lines of my article in the August issue: "Manufacture of Finer Sands for Concrete."

STANLEY M. HANDS.

Oakland, Calif.

September 6, 1935.

Dear Mr. ———

The manufacture of fine sands is I know a problem and also is the sale of it. So many engineers are confused between acceptance tests and tests pertaining to the concrete making qualities of a material.

We use the fine sands primarily to make the concrete smooth working. We have found that though adding sand to a mixture may increase the water we often are able to decrease the water by adding the right kind of sand. This fact caused us to investigate the finer fractions of our concrete sand and we found that invariably when the minus 30-mesh fraction approached 30% of the sand the water was more effective and could sometimes be reduced. Subsequently we made tests with a variable cement content and found that though we did not increase the weight of the sand in the batch, there appeared to be more useful mortar in our six-sack mixes, and that even in the lower cemented mixes there was a marked influence upon workability.

Standard Sand Gradings

It has been known for some time that for a given grading of aggregates the volume of water for a given wetness is not changed by the cement content if the volume of the concrete is constant. Thus, if a given mix worked with 6 sacks and 0.72 cu. ft. of water per sack, the mix would work with 5 sacks and 0.87 cu. ft. of water per sack. The strengths would vary accordingly. If, however, the sand was made finer as the cement was decreased it was found that 5 sacks might require only a w/c ratio of 0.82 with a corresponding increase in strength. And so we have arrived at some standards for sand gradings for 4-, 5- and 6-sack concrete of standard consistencies.

Neglecting such characteristics as shape and other surface characteristics, which may be of equal effect with screen sizes, we want 28-30% sand finer than 30-mesh, 70-75% finer than 10-mesh and nothing greater than ¼-in. for 6-sack structural concrete. For pavements this may be a little coarser. If we wish to lower the cement to 4 sacks we want 35-38% passing a 30-mesh and a little finer on the other screens. We want some 80- and 100-mesh in the sand say up to 6 and 3% in all cases.

We are not inclined to emphasize the idea of economy of cement which might be brought about by careful design of sand sizes. We are more interested in the possibilities of making concrete which is more workable, and therefore cheaper from this angle of placement costs. Grading is recognized as effective in cement economy and workability, but if a little cement is removed from some materials the effect is bad from the standpoint of successfully fabricating the mixture.

Vibrated Concrete Will Require Positive Control of Size

I think that we are rapidly approaching the stage where concrete mixtures will be placed in the forms and brought to the essential plastic stage with the vibrator. The term workability as we now apply it to the concrete outside the forms will then be lost. To make mixtures of the vibrator type there must be a very positive control of the size and character of the aggregates if vehicles to transport the mix are to be rapidly discharged and production maintained at the higher rates.

All of the concrete hoppers and containers used by the contractors on the Bay bridge were designed from notes of tests of the flow of concrete and concrete aggregates. An apparently insignificant variation in the size or character of certain aggregates choked up the flow of concrete to the forms. Thus, it seems to me, that workability, which means correct processing of aggregates, is by far the most important factor to be considered by the aggregate producer.

From my own experience as a producer of aggregates I draw my conclusions that such control is possible. In certain cases the present equipment will be found adequate, but in most cases the producer is overloading his equipment to such an extent that the manufacturer would hardly recognize the materials as products of such equipments. I expect that manufacturers will some day insist upon owners using the equipment for capacities they should be used for. The Kaiser Paving Co. does not overload. The result is a uniform product.

My recommendation to you is that you rig up an outfit known as the Powers remolding set, a description of which can be obtained from the Portland Cement Association, and that you duplicate some of the tests made by Powers, using your own materials. You can develop a material which will give a maximum of workability and this I think will be found to be a better sales point than the saving of a little cement. That is my present opinion. I can see that my own problems will be workable concrete as well as cement economy, but I shall emphasize workability most.

STANLEY M. HANDS.

An Industry Plan

THE EDITOR: Since the destroying of the NRA, through the Schechter poultry case decision, it seems that most industry is at the crossroads, and undecided as to which course to pursue, or what policy to follow. I have followed conditions closely for the past few years, and have given much thought to a proper solution; so that the chaotic conditions that are in existence today may be successfully and for all time overcome. I know that there have been plans upon plans submitted by various persons and organizations, but I firmly believe that the ideas given in this plan are both plausible and workable, and, given a fair test, will form a nucleus, about which a permanent working structure can be built.

The first step is to secure the proper legislation for the conservation of the natural resources, under which sand and gravel should be classed. I would think that the Federal Trade Commission should be the governing body under which this industry would operate. I do not think there would be any necessity for a proration clause, as in the oil industry; neither do I think the limiting of new plant capacity in a given territory is necessary. I do believe a minimum wage, and maximum hour setup is both desirable and necessary, and should be the only labor requirements necessary.

After the proper legislation has been passed, which should include both state and interstate operators, then one man from the industry itself, with the approval of the Federal Trade Commission, shall be the head of this industry, for its policy, etc., the same as Judge Kenesaw Mountain Landis is the head of organized baseball. This man should have available all cost records over the country, and such other data as seem necessary. The reason for the cost records is two-fold. Taking a leaf from the compensation insurance companies, at the end of each year, they figure your accident costs, and if you have a bad year, your rate rises, but if you have a good year, you are given credits, which lower your premium. Since the code was instituted, it was found that the average cost per ton was, I believe, 51c. With that figure to start from, the open price bidding, on jobs could be modified, and instead of having a posted price, merely have a minimum price, based on the previous year's average industrial cost per ton, below which no producer dare quote for fear of the fine that would be collected, when his low quotation was discovered. This leaf from the book of industrial experience is taken from the I.C.C. in their dealings with the railroads. It is possible that legislation would have to be shaped to cover this form of price control, but in natural resources, when they are used up, at no profit, and possibly at a loss to producers, a source of national income is dried up. By

this method of price control, the efficient operators could be rewarded for their efficiency and judgment, while the careless or inffiecient operators would either have to improve their operations or take a loss. This method would also give competitive bidding, as the only factor of which the competitors would know would be the minimum price, and as the price quoted would not have to be published, no one would have any advance information.

Since the NRA codes are a dead issue, and indications are that most industrialists thought they were a step in the right direction, they want something that will be permanent, along those lines. Now that the codes are off, the abuses by the small chiseling operators are coming to light, and I do not believe it will be remiss to list two of the worst abuses that are the hardest to control. The secret rebate plan seems to be the one most in vogue, but in cases where that is just a little too open, the chiseling producer will get the contractor to purchase a worthless gravel lease, for nearly nothing, and then buy this lease, at such a sum that will constitute a price reduction. With such rotten business tactics as that no honest producer can compete, and industry suffers.

An organization that will do such tricks, can not be controlled by private agreement alone; it would have to fear the Federal law, with its fines; and by that method alone, will it be kept on a competitive basis of quality, service, and then price. I would suggest that where a bad condition exists, burden of proof should be on the other producers that are affected, as it is income out of their pockets; so by their efforts to correct the condition will they profit by future business. If a producer should have information, whereby he knows that a competitor is cutting below the minimum price for that region, or for that period, if he sets the same price and does not file a complaint, then when this does come before the commission, and it can be proved that the one violated the price provision, and the other knew of this condition, then they both should be found equally guilty, and fined the same amount. By this method, there would be no condition of the one holding an axe over the other, but rather, a cleancut business rivalry that would call for the best talent, and most initiative available.

With the setup of the industry supervisor and his staff, the country could be cut, as at present, into regions, with a small staff working in each region. The cost of administration should be as proposed in the code, with the ability to fine and collect, from any producer who failed to pay his proportionate assessment. Under the codes, a few producers had to carry the whole load, while the usual chiselers paid nothing, took the business by unfair tactics and went unmolested.

I can not conceive of a very complicated technical setup to handle this type of industry control, neither do I believe it will cost the producers a very large sum; so I feel that with proper coöperation from the government, and among the producers, a workable condition can be attained.

The "New Deal" and its principles are worth striving for, and while it has been given a setback, I believe with the experience of the past year, this plan, or another plan, will be fabricated, that will insure the results that the codes were striving for.

W. C. Torbett, Jr.
Superintendent Romayor Plant,
S. & G. Company
Romayor, Tex.
July 11, 1935.

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Republic vs. Democracy

THE EDITOR: Your editorials are uniformly good, or at least you approach as nearly 100% agreement with my philosophy as could be expected. Few, if any, people agree with me in *everything*.

But I want to make a particular comment on the correct distinction shown between Democracy and Republic in the last paragraph of your editorial on page 22, Rock Products for October. This distinction was bought out in the *Federalist* very clearly. Doubtless you are familiar with it; but, if not, here is a copy.

B. F. Affleck.
Chicago, Ill.,
October 10, 1935.

Federalist No. 10

"Hence it is that such democracies have ever been spectacles of turbulence and contention; have ever been found incompatible with personal security or the rights of property, and have in general been as short in their lives as they have been violent in their deaths."

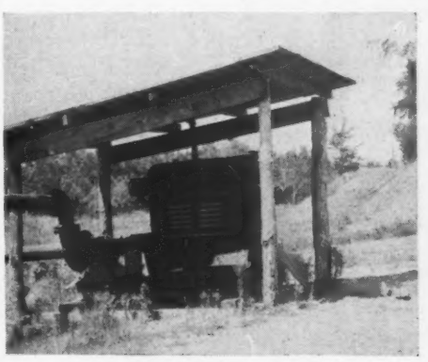
"A republic, by which we mean a government in which the scheme of representation takes place, opens a different prospect, and promises the cure for which we are seeking."

Federalist No. 14

"Opposition seems to owe its rise and prevalence chiefly to the confounding of a republic with a democracy and applying to the former reasons drawn from the nature of the latter. The true distinction between these forms was also adverted to on a former occasion. . . ."

Buys Contractor's Semi-Portable Gravel Plant

Memphis Stone and Gravel Co., Memphis, Tenn., early this year purchased a semi-portable sand and gravel plant, located near Pope, Miss., formerly owned and operated by Foley Bros., contractors, St. Paul, Minn. The plant is all-steel, Pioneer equipped. The gravel deposit is a bank of variable thickness and overburden. A 1 cu. yd. Bucyrus 50B steam-driven shovel loads 2-ton end dump motor trucks, which in turn discharge into a loading hopper. This hopper discharges to a 24-in. conveyor belt, 125-ft. centers, which carries the material to the washing and screening plant. The material first passes through a 60-in. cylindrical sand screen and then a 42-in. gravel screen. The plant is equipped also with a sand drag. Finished material goes to two identical 21-yd. steel bins. Wash water is supplied by a Fairbanks-Morse 6-in. pump, driven by a 40-hp. Waukesha gasoline engine. The bins, by means of sliding gates, discharge to a 27-in. belt conveyor, extending out over the railway tracks. The sand passes on a conveyor of 40-ft. centers to the near track and the gravel on a conveyor of 55-ft. centers to the far track. The entire plant is driven by a 100-hp. Waukesha gasoline engine, by means of a belt and chain drive.



Wash water supply

Semi-portable plant of the Memphis Stone and Gravel Co.

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Allentown P. C., com.[47]	10-19-35	5	6	
Allentown P. C., pfd.[47]	10-19-35	6	7	
Alpha P. C., com.	10-19-35	15⅞	actual sale	.25 (qu.) Oct. 25
Amalgamated Phos. 6's, 1936[47]	10-19-35	102	103	
American Aggregates, com.[48]	10-11-35	1	2	
American Aggregates, pfd.[48]	10-11-35	2	6	
American Aggregates, 6's 1st mtg. 3/6's, 1943, new bonds[48]	10-11-35	45	....	
American Aggregates, 6's, 1943, old bonds[48]	10-11-35	45	....	
American L. and S., 1st 7's[48]	10-11-35	102	....	
Arundel Corp., com.[48]	10-11-35	20	22	
Ashgrove L. & P. C., com.[49]	10-17-35	11¼	....	
Ashgrove L. & P. C., pfd.[49]	10-17-35	95	....	
Bessemer L. and C., Class A[47]	10-19-35	10	13	
Bessemer L. and C., 1st 6½'s, 1947[48]	10-11-35	43F	....	
Bessemer L. and C., cert. of dep., 1947[48]	10-14-35	45	50	
Boston S. and G., new, com.	10- 9-35	1	actual sale*	
Boston S. and G., new 7%, pfd.[37]	10-11-35	6	8	
Boston S. and G., 7's, 1939[37]	10-11-35	70	75	
Calaveras Cement, com.[40]	10-14-35	3¾	4¼	
Calaveras Cement, 7% pfd.[40]	10-14-35	61	65	
California Art Tile, A[9]	10-14-35	7	9	
California Art Tile, B[9]	10-14-35	½	1	
Canada Cement, com.[42]	10-12-35	5⅛	5⅞	
Canada Cement, pfd.[42]	10-12-35	51½	53	
Canada Cement, 5½'s, 1947[42]	10-12-35	103½	104	
Canada Crushed Stone, bonds[42]	10-12-35	90	....	
Canada Crushed Stone, com.[42]	10-12-35	5	nominal	
Certainteed Products, com.	10-18-35	6¼	actual sale	
Certainteed Products, pfd.	10-18-35	60⅝	actual sale	
Certainteed Products, 5½'s, 1948	10-18-35	88	89½	
Consol. Cement, 1st 6½'s 1950[47]	10-19-35	74	76	
Consol. Cement com.[47]	10-19-35	4½	5½	
Consol. Oka. S. and G. (Can.). 6½'s[42]	10-12-35	25	....	
Consol. S. and G., pfd.[42]	10-12-35	25	....	
Consol. Rock Products, com.[47]	10-19-35	1	....	
Consol. Rock Products, pfd.[47]	10-19-35	1	2	
Consol. Rock Products, units	10-19-35	2	3	
Construction Mat., com.	6-12-35	6c	actual sale†	
Construction Mat., pfd.	6-12-35	12c	actual sale‡	
Consumers Rock & Gravel, 1st mtg. 6½'s, 1948[47]	10-19-35	20	25	
Coosa P. C., 1st 6's[47]	10-19-35	25	30	
Coplay Cement Mfg., pfd.[47]	10-19-35	10	12	
Coplay Cement Mfg., 6's, 1941[47]	10-19-35	65	70	
Cumberland P. C., 7's, 1937[47]	10-19-35	75	80	
Dewey P. C., com.[47]	10-19-35	35	40	
Dolese and Shepard	10- 9-35	25	27	
Dufferin Pav. and Cr. Stone, com.[42]	10-12-35	2	3	
Dufferin Pav. and Cr. Stone, pfd.[42]	10-12-35	20	25	
Federal P. C., 6½'s, 1941[47]	10-19-35	10	20	
Fla. Port. Cement, 6½'s, 1937[46]	10-14-35	99½	100½	
Fla. Port. Cement, units[47]	10-19-35	30	32	
Giant P. C., com.[47]	10-19-35	3	5	
Giant P. C., pfd.[47]	10-19-35	10	13	
Gyp. Lime & Alabastine, Ltd.	10-18-35	5	5½	
Gyp. Lime & Alabastine, 5½'s, 1948[47]	10-19-35	92	95	
Hawkeye P. C., cap.[49]	10-17-35	30	....	
Hercules Cement, com.[49]	10-17-35	18	....	
Hermitage Cement, com.[47]	10-19-35	10	15	
Hermitage Cement, pfd.[47]	10-19-35	80	90	
Ideal Cement, 5's, 1943[47]	10-19-35	103	104	
Ideal Cement, com.[47]	10-19-35	45	46	
International Cement 5's, 1948	10-18-35	102½	104	
International Cement, com.	10-18-35	26⅝	26⅞	
Kelley Island L. and T.	10-18-35	16¼	17¾	
Ky. Cons. Stone, 6½'s, 1938[47]	10-19-35	20	25	
Ky. Cons. Stone, com.[47]	10-19-35	1	2	
Ky. Cons. Stone, pfd.[47]	10-19-35	2	3	
Ky. Cons. Stone, 1st mtg. 6½'s[46]	10-14-35	14	15	
Ky. Rock Asphalt, 6½'s, 1935[47]	10-19-35	30	35	
Lawrence P. C.	10-14-35	12½	13½	
Lawrence P. C., 5½'s, 1942[47]	10-19-35	96	98	
Lehigh P. C., com.	10-18-35	12	12¼	
Lehigh P. C., 7% pfd.	10-18-35	95	100¼	
Louisville Cement[47]	10-19-35	85	95	
Lyman-Richey 1st 6's, 1935[47]	10-19-35	15	20	
Marbelite Corp., com. (cement pts.)[40]	10-14-35	¼	½	
Marbelite Corp., pfd.[40]	10-14-35	4	....	
Marblehead Lime, 7's, 1941[14]	10-16-35	70	80	
Marquette Cement, com.[47]	10-19-35	24	26	
Marquette Cement, pfd.[47]	10-19-35	95	100	
Marquette Cement Mfg. 1st 6's, 1935[46]	10-14-35	Called for payment Oct. 1 @ 102		
Material Service Corp.[47]	10-19-35	4	6	
McCrady-Rodgers, com.[47]	10-19-35	6	8	
McCrady-Rodgers, 7% pfd.[47]	10-19-35	35	40	
Medusa P. C., com.[47]	10-19-35	13	16	

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Medusa P. C., pfd.[47]	10-19-35	50	55	
Michigan L. and C., com.[47]	10-19-35	50	55	
Missouri P. C.	10-18-35	8⅛	8⅜	
Monarch Cement, com.[47]	10-19-35	75	85	
Monolith P. C., com.[9]	10-16-35	2	2½	
Monolith P. C., 8% pfd.[9]	10-16-35	4½	5	
Monolith P. C., units[9]	10-14-35	11	12½	
Monolith P. C., 1st mtg. 6's[9]	10-14-35	100	101	
Monolith Portland, Midwest, pfd.[9]	10-16-35	1¼	1½	
National Cement (Can.) 1st 7's[42]	10-12-35	102	100	
National Gypsum A., com.[47]	10-19-35	24	36	
National Gypsum, pfd.[47]	10-19-35	99	101	
National Gypsum, 6's[47]	10-19-35	104	106	
National L. and S., 6½'s, 1941[47]	10-19-35	60	70	
Nazareth Cement, com.[47]	10-19-35	4	5½	
Nazareth Cement, pfd.[47]	10-19-35	45	48	
Newaygo P. C., 7% cum. pfd.[49]	10-17-35	33	....	
Newaygo P. C., 1st 6½'s, 1938[46]	10-14-35	97	100	
New England Lime, units[14]	10-16-35	7	10	
N. Y. Trap Rock, 1st 6's, 1946	10-18-35	77	79⅞	
N. Y. Trap Rock, 6's, stamped, 1946	10-18-35	79	actual sale	
North Amer. Cement, 1st 6½'s, 1953[47]	10-19-35	18	21	
North Amer. Cement, 6½'s, 1943[47]	10-25-35	80	88	
North Amer. Cement, 6½'s, 1940[47]	10-19-35	50	52	
North Amer. Cement, com.[47]	10-19-35	2	3	
North Amer. Cement, 7% pfd.[47]	10-19-35	3	4	
North Shore Mat. 1st 6's[47]	10-19-35	46	50	
Northwestern Port. Cem. units[9]	10-14-35	43	....	
Northwestern States P. C.[47]	10-19-35	17	20	
Ohio River S. and G., com.	10-19-35	....	2	
Ohio River S. and G., 1st pfd.	10-19-35	66	....	
Ohio River S. and G., 2nd pfd.	10-19-35	....	7	
Ohio River S. and G., 6's[46]	10-14-35	9	11	
Oregon P. C., com.[47]	10-19-35	3	5	
Oregon P. C., pfd.[47]	10-19-35	65	70	
Pacific Coast Agg., new com.[46]	10-14-35	1¾	1⅞	
Pacific P. C., com.[40]	10-14-35	2½	3¼	
Pacific P. C., pfd.[40]	10-14-35	35	38½	
Peerless Cement, com.[47]	10-19-35	½	1	
Peerless Cement, pfd.[47]	10-19-35	3	4	
Penn.-Dixie Cement, com.	10-18-35	3½	actual sale	
Penn.-Dixie Cement, pfd.	10-18-35	21	23	
Penn.-Dixie Cement, 6's A, 1941	10-18-35	88	89	
Penn. Glass Sand Corp., 6's[47]	10-19-35	106	107	
Penn. Glass Sand Corp., pfd.[47]	10-19-35	104	106	
Petoskey P. C., 6's, 1941[48]	10-11-35	90	....	
Petoskey P. C., 6's, 1935-38[48]	10-11-35	90	....	
Petoskey P. C., com.[48]	10-11-35	3¾	....	
Republic P. C., 6's, 1943[47]	10-19-35	94	97	
Riverside Portland Cement, A[9]	10-16-35	5½	7	
Riverside Portland Cement, B[9]	10-14-35	⅝	1	
Riverside Portland Cem., pfd.[9]	10-16-35	91	93	1.50 (qu.) Nov. 1
Rockland and Rockport Lime, 1st pfd.[47]	10-19-35	3	5	
Santa Cruz P. C., com.[9]	10-14-35	30	35	
Schumacher Wallboard, com.[9]	10-14-35	1½	2½	
Schumacher Wallboard, pfd.[9]	10-14-35	8¼	9½	
Signal Mt. P. C., units[9]	10-19-35	36	38	
Southwestern P. C., units[40]	10-14-35	200	....	
Spokane P. C., units[49]	10-17-35	7	....	
Standard Paving & Mat. (Can.), com.[42]	10-12-35	1	..	
Standard Pav. & Mat., pfd.[42]	10-12-35	10	12	
Superior P. C., A[40]	10-14-35	40	45	.55 (qu.) Nov. 1
Superior P. C., B[40]	10-14-35	12	13	
Trinity P. C., units[47]	10-19-35	17	20	
U. S. Gypsum, com.	10-18-35	78½	80	
U. S. Gypsum, pfd.	10-18-35	158½	actual sale	
Volunteer P. C., 1st 7's, 1942[49]	10-17-35	90	....	
Volunteer P. C., units[49]	10-17-35	52	77	
Vulcanite P. C., com.[49]	10-17-35	3	6	
Vulcanite 7½'s, 1943[49]	10-17-35	59	....	
Wabash P. C.[47]	10-19-35	8	10	
Warner Co., ww. 1st 6's, 1944[47]	10-19-35	55	57	
Warner Co., com.[47]	10-19-35	2	3	
Warner Co., pfd.[47]	10-19-35	5	7	
Whitehall Cement Mfg., com.[47]	10-19-35	29	31	
Whitehall Cement Mfg., pfd.[47]	10-19-35	55	60	
Wisconsin L. & C., 1st 6's, 1940[47]	10-19-35	50	55	
Wolverine P. C., com.[47]	10-19-35	3	4	
Yosemite P. C., A. com.[40]	10-14-35	2⅞	3⅛	

Quotations by: [9]A. E. White Co., San Francisco, Calif. [14] The Securities Co. of Milwaukee, Inc., Milwaukee, Wis. [37]Wise, Hobbs & Seaver, Inc., Boston. [40]Martin Judge, Jr., and Co., San Francisco, Calif. [42]Nesbitt, Thomson & Co., Toronto. [46]First National Bank of Chicago, Chicago, Ill. [47]Anderson Plotz and Co., Chicago, Ill. [48]Hewitt, Ladin & Co., New York, N. Y. [49]Feldman & Co., Inc., Boston, Mass.

† 60 shares sold at auction, at New York, N. Y.
‡100 shares sold at auction, at New York, N. Y.
*10 shares sold at auction at Boston, Mass.
F—Flat.

Recent Dividends Announced

Riverside Cement, $6 pfd. (quar.)	$1.50	Nov.	1, 1935
Superior P. C., A	.55	Nov.	1, 1935

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Lehigh Portland Cement Co., Allentown, Penn., reports for the 12 months ended September 30, 1935, net profit of $265,712 after taxes, depreciation, depletion and obsolescence, equal to $2.15 a share on 124,072 shares of $100 7% preferred stock, excluding reacquired shares. This compares with $495,853, or $3.14 a share on 157,817 preferred shares, for the 12 months ended September 30, 1934.

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American Aggregates Corp., Greenville, Ohio, reports for the year ended December 31, 1934:

Net sales (after deducting allowances, trade and cash discounts, etc.)	$907,056
Cost of sales	770,345
Gross profit on sales (before depreciation and depletion)	$136,711
Profit from allied operations	46,559
Total profit	$183,270
Selling and administrative expense	112,167
General expense	24,351
Net profit before interest earned and interest paid and depreciation and depletion	$ 46,751
Interest earned and miscellaneous income	34,977
Total	$ 81,729
Interest paid on real estate obligations and amortization of bond discount and expense	24,077
Interest on first mortgage bonds	57,794
Depreciation and depletion	289,161
Net loss	$289,304

The tonnage sold in 1934 was 1,834,987 against 1,785,164 in 1933.

Current assets were $291,039, of which $78,172 was cash, and current liabilities were $136,896.

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New Haven Trap Rock Co., New Haven, Conn., reports a consolidated balance sheet as of July 31, 1935, as follows:

Assets:	
Plants and properties	$2,929,356
*Investments	133,750
Current Assets:	
Cash	17,085
Accounts receivable	256,828
Notes receivable	6,240
Crushed stone	79,751
Supplies	5,757
Suspense	19,535
Prepayments	29,510
Total	$3,477,813
Liabilities:	
Preferred stock	$1,664,000
Common stock	1,040,800
Debenture bonds	110,000
Mortgages payable on plant, etc.	37,000
Current Liabilities:	
Notes payable	207,500
Accounts payable	105,618
Taxes payable (Branford R. R. Co.)	1,462
Depreciation reserve	128,419
Depletion reserve	1,235
Compensation insurance reserve	35,360
Surplus	146,419
Total	$3,477,813
Current assets	$ 365,661
Current liabilities	314,580
Working capital	51,081

*Includes $110,000 bonds and stocks of Conn. Quarries Co., Inc.

General Crushed Stone Co., Easton, Penn., reported to the Massachusetts Corporation Commission for the year ended December 31, 1934, a consolidated balance sheet as follows:

Assets:	
Cash	$ 483,243
Accounts receivable, customers'	163,504
Accounts receivable, others	9,321
Notes receivable, customers'	13,500
Notes receivable, others	9,860
Merchandise	165,384
Supplies	71,711
Securities	321,469
Real estate	86,170
Machinery	2,147,082
Vehicles	19,350
Equipment and tools	1,143
Furniture and fixtures	5,876
Prepaid items	5,636
Good will	293,663
Total	$3,796,912
Liabilities:	
Accounts payable	$ 66,092
Notes and acceptances payable	277,251
Mortgages	5,500
Bonds	55,300
Reserve for contingencies	50,000
Reserve for compensation liabilities	28,283
Accrued accounts	11,589
Capital stock	3,000,000
100,000 shares no par value	100,000
Surplus	202,897
Total	$3,796,912

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International Cement Corp., New York City, will call for redemption on November 1, 1935, at 103¼ and accrued interest, $5,000,000 principal amount of the $18,000,000 original issue of 20-year 5% convertible gold debentures due in 1948. Under the terms of the indenture the Chase National Bank, acting as trustee, will draw by lot the debentures to be redeemed.

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Rockland-Rockport Lime Co., Rockland, Me., reports for the year ended December 31, 1934, a net loss, after depreciation, depletion and interest charges of $85,290 as compared with a net loss of $174,796 for the year ended December 31, 1933.

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Marquette Cement Manufacturing Co., Chicago, Ill., reported for the years ended December 31, balance sheet as follows:

Assets:	1934	1933
Fixed assets	$10,235,313	$11,069,341
Investments	278,137	87,524
Current Assets:		
Cash	2,204,249	1,828,502
Notes and accounts receivable	392,023	459,906
Merchandise	1,023,665	854,076
Deferred charges, etc.	422,530	486,949
Total	$14,555,918	$14,786,298
Liabilities:		
6% preferred stock (par $100)	$ 3,772,400	$ 3,848,400
Common stock	3,319,150	3,227,675
Funded debt	*2,615,500	2,877,000
Current Liabilities:		
Accounts payable	413,365	132,037
Accruals	41,990	49,448
Reserve for taxes	150,972	177,576
Funded debt (current)	253,000	265,000
Reserve for compensation liabilities	37,066	70,551
Surplus	3,952,475	4,138,610
Total	$14,555,918	$14,786,298
Current assets	$ 3,619,938	$ 3,142,484
Current liabilities	859,327	624,061
Working capital	2,760,611	2,518,423

*Retired October 1, 1935. See ROCK PRODUCTS, October. p. 48.

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Pennsylvania Glass Sand Corp., Lewiston, Penn., reports for six months ended June 30, 1935, profit of $229,346 after depreciation, interest, etc., but before federal taxes, comparing with profit before federal taxes, of $133,273 in first six months of 1934.

Will Liquidate

Meramec Portland Cement and Material Co., St. Louis, Mo., with gravel plant at Sherman, Mo., and retail builders' supply yards in the city, was declared bankrupt in the federal court on October 12, and Elmer E. Pearcy, an attorney, was appointed trustee to liquidate the concern.

Several months ago the company filed a debtor's petition to effect reorganization, but George Ratermann, president, said it tried unsuccessfully through the Reconstruction Finance Corporation, banks and individuals to effect a plan. The company and creditors joined in a request for liquidation.

In its petition for reorganization, the company estimated assets at $488,883, including real estate, buildings and machinery on which mortgages were in default. Liabilities were placed at $457,713, exclusive of capital stock. The stock outstanding consists of 3000 shares of $100 par common and 1000 shares of 7% cumulative preferred, par $100.

Consolidates Purchasing

Universal Atlas Cement Co., Chicago, Ill., has consolidated its purchasing department with that of the Carnegie-Illinois Steel Corp., under Frank J. Rief. Both companies are subsidiaries of the United States Steel Corp., and this consolidation is part of the steel corporation's policy of unifying activities. Mr. Rief succeeds W. H. Dutcher, who has retired after more than 30 years with the Universal company.

Promoting Use of Lime from Acetylene Waste

Linde Air Products Co., New York, N. Y., has issued a 20-page booklet on "The Utility of Carbide Residue." This residue, of course, is hydrated lime. The booklet tells how this can be used as the principal ingredient in whitewash, fireproof cement, mortar, plaster, concrete or stucco. Formulas and hints for the preparation and utilization of these various covering agents and construction materials are given. The industrial uses of the residue as an oil and dirt scavenger, as a cleaner for drainage pipes, as a brake and clutch dressing for machinery, and as an ingredient in boiler lagging are described. Among the agricultural uses of carbide residue for which directions and formulas are given are: spraying plants and orchards, killing insects, correcting soil acidity, improving soil tilth, preserving wooden fence posts, and disinfecting and deodorizing farm buildings.

Lime Producers' Forum

Conducted by Victor J. Azbe,
Consulting Engineer, St. Louis, Mo.

The Burning of Spalls in Mixed Feed and Natural Gas-Fired Kilns—Part I

TO LIME MANUFACTURERS disposal of small rock of below "4" in size is ordinarily quite a problem, for it is generally assumed that such rock cannot be burned in vertical kilns. Some of the larger producers use rotary kilns for the burning of rock below 2 in., some dispose of the small rock in other ways as for crushed stone, but this ordinarily at a price disadvantage. In most cases, however, small rock is hauled to the dump, a total loss.

Of course, it is a fact that small rock admixed with large rock and so charged will greatly upset the kiln performance. The smalls will fill the voids among the large rock and so greatly interfere with the flow due to the draft. They also will obstruct free circulation of gases and thus reduce capacity as well as cause lime to be non-uniformly burned.

Still we must say that small rock, upsetting as it may be when charged with large rock, burned alone in sizes of proper range in properly and purposely designed vertical kilns, shows great advantages over large rock. The vertical kiln of correct design, with small rock, is a lime burning system unequaled in economic values by any other system.

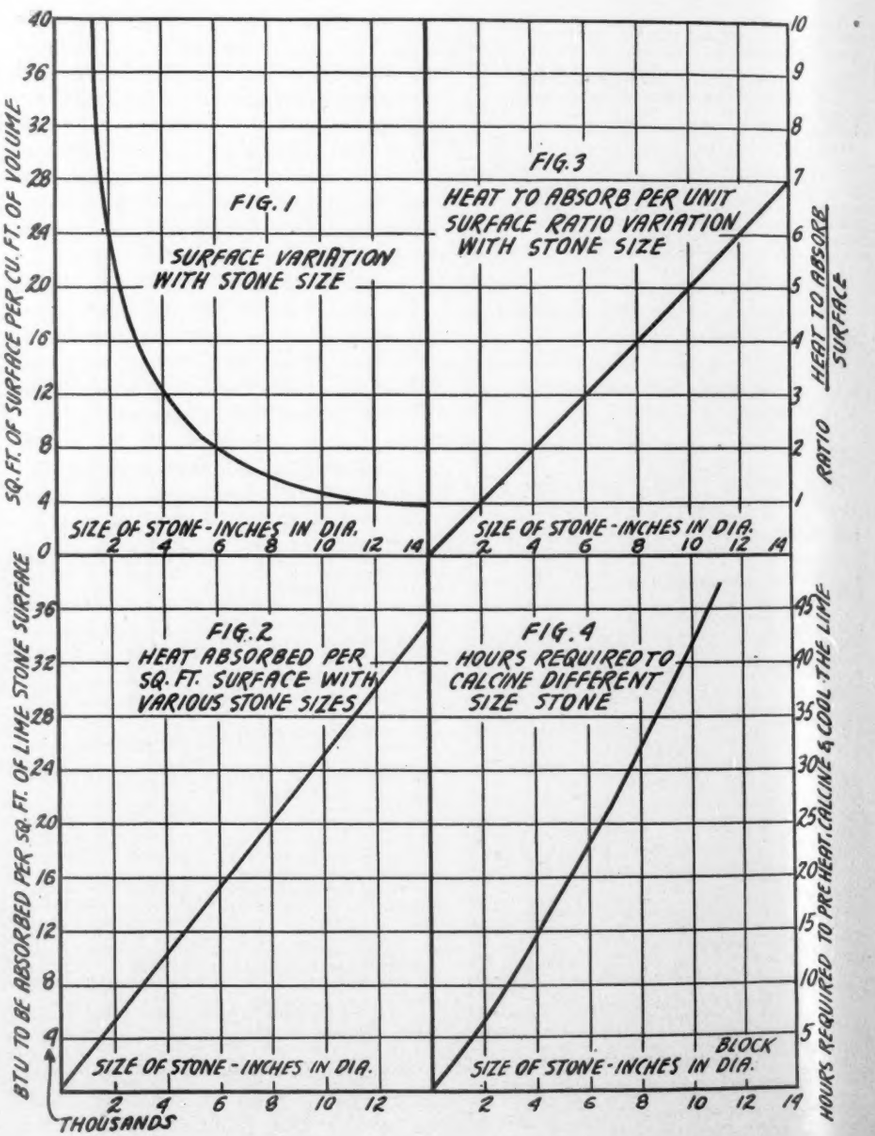
It should be realized that in lime burning the main factors are those of amount of surface of heat transfer, and of heat distribution. These also govern the performance of any other heat absorption apparatus, as for example a boiler, condenser or heater of any kind. In old days they built boilers with very large tubes, but in recent years it has been found that boilers with small tubes are more capacious as well as more efficient. Naturally, a given space packed with small tubes will present a far greater surface; and it is this surface that does the absorbing of heat; equally, a lime kiln packed with small stone will have more surface and will do more work provided the heat—the hot gases—find access to the surface. Not only will there be more surface, but the heat transfer rate will be higher, and the surface will be more efficient.

Of course if spalls of say ¾ by 1½ in. size are charged into an ordinary vertical lime kiln, results of the worst kind may be expected. Nevertheless, rock of this size is the best rock to burn of any size ranging from ¼ in. to 12 in. That in the past large rock was burned exclusively is all because essential knowledge was lacking as to how to design kilns for small rock. It should be realized that it is not the cubical size of the kiln that counts, but rather the surface therein.

Charts Explained

Fig. 1 shows what surface one cubic foot of kiln space would present filled with different sizes of rock. For 12-in. rock it would be 4 sq. ft.; for 6-in. it would be 8 sq. ft. and for rock of 1½-in. diameter the surface would be 30.8 sq. ft. or 7½ times as great as for 12-in. As active surface is capacity, one could say that the kiln filled with 1½ in. as compared to one with 12-in. rock has a potential capacity 7.7 times greater. In view of this, a spall kiln to burn 50 tons of lime a day would not need to be of any great size. The curve demonstrates the heat absorbing surface doubles as the size of stone is halved.

Fig. 2 shows the amount of heat one square foot of stone-lime surface in the kiln has to absorb for pre-heating and complete calcination. This is based on 2000 B.t.u. required for heat of pre-heating and for dissociation; and the surface the corresponding size of fragment presents in the kiln. It will be noted that heat to be transferred for a given capacity is ever so much less with small stone. This is further demonstrated in Fig. 3 which expresses the ratio of heat to surface, and shows a great advantage for small stone.



This is further developed in Fig. 4, wherein the hours required to pre-heat, calcine and cool the various sizes of stone are given. Different authorities have experimental data on this subject, but those deducted from Block appear the most consistent with practice. It will be noted that the smaller sizes burn faster than the heat-surface ratio previously given would lead one to expect; this is for reasons of better heat transfer, which will be further developed later. As it is, stone of 1½-in. size requires five hours while stone of 8-in. size requires 32 hours, under normal conditions. This time can, however, be varied if the temperature is raised, or temperature difference increased, or heat transfer by virtue of higher velocity improved; all of which would reduce the time required by a considerable amount.

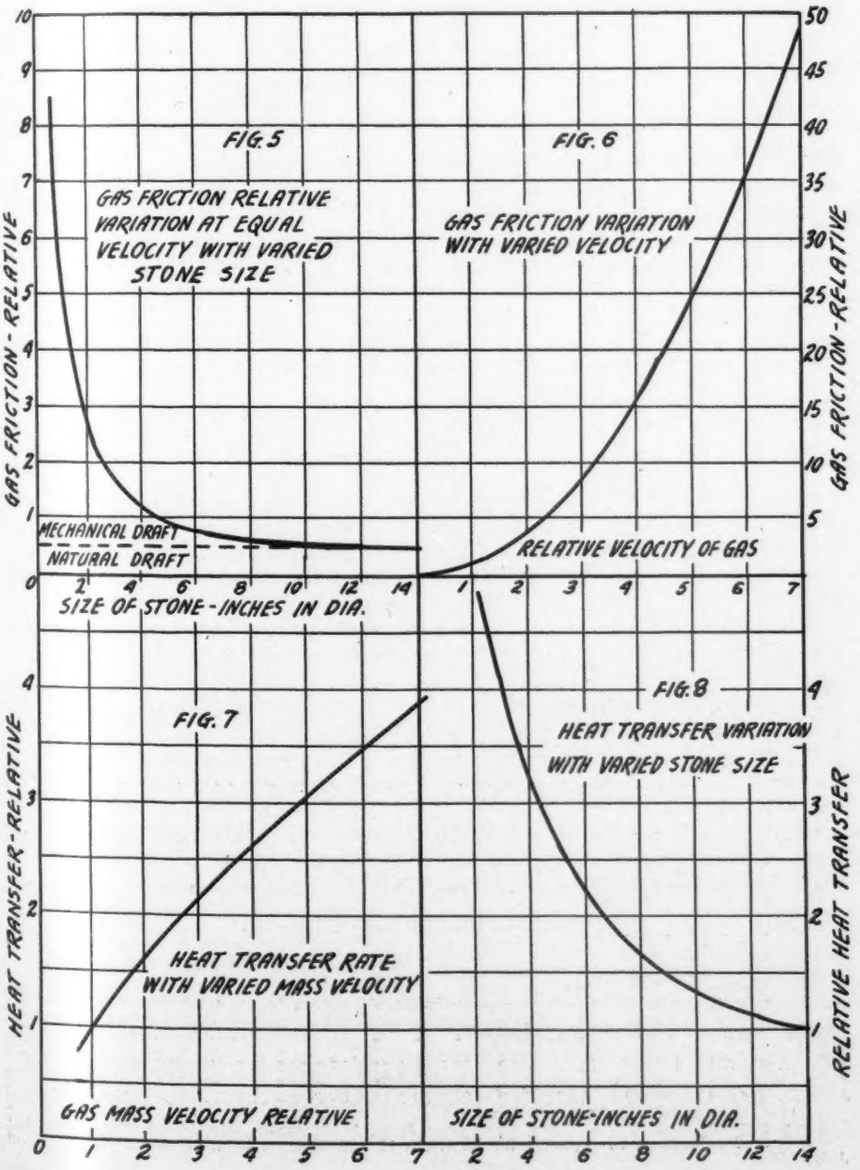
Opertaing the kiln with spalls, even at a low capacity, would greatly increase the draft required, as friction losses in flow of gas increase as the size of the passage decreases. Friction varies inversely as the stone size and for 5-in. stone will be twice as great as for 10-in. and for 1½-in. stone it would be six times as great. (See Fig. 5). This can also be deducted from the following Fanning's equation which applies to turbulent flow, as we have in kilns.

$$\Delta P = \frac{F P L U^2}{2 G M}$$

Where

ΔP = Pressure drop, pounds per sq. ft.
F = Friction factor.
P = Density, pounds per cu. ft.
L = Height in feet.
U = Velocity, feet per sec.
M = Hydraulic radius in feet.

It will be noted that friction varies directly as the density of the gas, as the height of the charge in kiln, as the square of velocity of the gas through the kiln, and as the hydraulic radius, which varies directly with the size of the stone.



Mechanical Draft Necessary

A lime kiln, as a chimney, can produce only a very limited amount of natural draft, hardly more than half or three-quarters of an inch. It is apparent that for small sized stone, mechanically produced draft is necessary, even when a kiln is to operate at a capacity the same kiln would have with large rock. But, in such a case, little advantage would be obtained from increased surface in the kiln. To derive benefit from small-sized rock the kiln has to be forced, so capacity corresponds in some high degree with the increase of surface. This, however, tremendously increases gas friction, as friction varies not only directly as the size of stone as shown in Fig. 5, but also as the square of velocity, as demonstrated by the above equation.

Assuming we have a kiln burning 5- to 10-in. rock with natural draft and a capacity of 15 tons of lime a day, the draft, while unmeasurable, as it is used up in friction as soon as created, must be around 0.5 in. Supposing this kiln was suitable for satisfactory burning of ¾x1½-in. stone, this small rock for equal capacity would need a draft about 4 to 5 times as great, or for the same capacity in addition to natural draft that is created, at least some 2 in. of mechanical draft would be required.

But 15 tons is no capacity for a spall kiln when it is capable of producing 15 tons with large stone. There is ample surface for 7 times the lime, at 105 tons of lime per day, taking it as an extreme case. However, this capacity will not be practicable because the friction loss will be too great. If with spalls and a 15-ton capacity 2 in. of mechanically produced draft is needed, then at seven times that capacity the draft necessary will be the startling figure of 125 in. of water gauge. If, however, we move down into more practical limits of, say, 50 tons of lime, the draft will be only 25 in. But since it will be perfectly senseless to carry an unusually high burden of stone, if its surface is not utilized, the height of the charge could readily be reduced to half, which would reduce the draft required to half. Twelve inches pressure is no high figure any more; and it is doubtful whether the pressure will be this high, as other saving factors enter, to be discussed hereafter.

It seems that this high draft loss—this great friction—is very disadvantageous; but that is not so, as the evil of friction brings on the benefit of high heat transfer. The power used in overcoming friction is usefully employed in scrubbing the dead film of cooled gases from the limestone surface and replacing it with others at high temperature. It is quite readily possible for a unit of surface to do double the work without an increase of temperature head by merely increasing the friction.

The heat transfer equation commonly used, which applies fairly well to turbulent

flow and demonstrates the governing variables, is:

$$H_g = \frac{0.22\, C_p\, T_p\, {}^{2}/_{3}\, V^{0.8}}{D^{0.2}}$$

where

V = Pounds of gas per second per sq. ft. of free area.
C_p = Average specific heat at constant pressure.
T_p = Mean temperature of the gas film in deg. F.
D = Equivalent diameter of the gas passage.
H_g = Convection coefficient.

While in the lime kiln much heat is transferred by radiation, which is independent of gas velocity, most of the heat is transferred by convection which, as shown in the above equation, in great measure depends upon velocity and varies as the eight-tenths power of the weight of gas flowing. Heat transfer also varies as the two-thirds power of mean temperature of the gas film, so greatly increasing at higher temperatures, it also depends upon the diameter of the air passage, the smaller such passage the higher the heat transfer. The factors of higher velocity and smaller gas passages would so work to quite an advantage with spall kilns. To what extent is demonstrated in Fig. 7.

Effect of Size Reduction

Fig. 8 shows the increase in heat transfer rate without change of velocity by the mere reduction in size of stone, and so the increase in friction caused by the reduction of size, even when capacity is not increased, is not for naught.

This subject of heat transfer was studied most thoroughly by C. C. Furnas, Bureau of Mines, and his conclusions are that heat transfer of the lime varies as 0.7 instead of 0.8 and the various equations developed by him follow:

Effect of velocity on heat transfer ..... $= K = CV^{0.7}$
Effect of temperature on heat transfer..... $= K = cT^{0.3}$
Effect of particle size on heat transfer ..... $= K = d^{0.9/0.3}$

and the summarized equation including the above, as well as the effect of voids, is:

$$K = \frac{AV^{0.7}\, T^{0.3}\, 10^{\,1.68f\,-\,3.56f^{3}}}{d^{0.9}}$$

We now have a most surprising, even startling situation before us. From the beginning lime was burned in large lumps and the burning of small rock was considered impractical in any but rotary kilns. Vertical kilns of great size were built and operated with natural draft. Great cubical volume and great heights were desired. The fact was forgotten entirely that cubical volume was not the governing factor but rather the surface. This is now bound to change. The change will be slow but is assured. For a certainty small rock will not much longer be wasted, and soon rock will be crushed with the hope for small rather than large sizes, the ¾ by 1½-in. will probably be considered most desirable.

With this sized stone surprising results will be secured. Capacity from 50 to 100 tons from kilns now producing 10 or 15 tons, efficiency not now obtained. By the use of small rock, surface will be greatly increased, and as the size of voids will be simultaneously reduced, heat transfer will be greatly increased. Then as surface and its efficiency will be so greatly increased, to supply heat at a rate it can take, kilns will have to be forced. This forcing will increase velocities and in turn again bring on an increase in efficiency of the surface. So it will all come to this, that high as capacity may be, there will be little reason for kilns higher than 25 to 40 ft.; and again, high as capacities may be, there will be little reason for shafts greater in cross-sectional dimensions than about 4x8 ft. While the kilns will be low, top temperatures will be lower than they are today with lump lime and kilns 100 ft. high. The vertical kiln will be able to do what the rotary can do, and with more efficiency from the fuel standpoint, as well as efficiently from a labor standpoint, with lower investment costs and lower repairs. But of course the rock will have to be fairly uniform in size. One can't block a rotary, but much small stuff will block a spall-burning, vertical kiln.

(To be concluded)

Public Tribute to Lime Company

THE WAY for industry to build goodwill, which will some day help to hold its own against the inroads of government, is for each and every member of industry to build local goodwill—in many cases merely by bringing facts to the attention of its local public—as the Batesville White Lime Co., Batesville, Ark., has done. Following are a few paragraphs from quite a lengthy tribute in the *Newark* (Ark.) *Journal*:

"Since its establishment here in 1924, this company has furnished an average of 100 persons with employment. At present there are 128 employes of the company, who draw a combined weekly pay of approximately $2000.

"Unlike so many other industries, this company did not cease operations for a single day during the depression. As a matter of fact, the plant has not been closed a single day since it opened in 1924. Work goes on seven days out of the week, for the burning of lime requires the continuous operation of the plant.

"This is one of the main factors why Independence county was one of the first counties to recover from the depression. While this company was, naturally, affected by the depression, a system of rotation of its employes was so effective that it allowed none of them to go on relief rolls. That, in itself, should justify all the praise and coöperation the people of this county are able to give. It has been estimated that nearly 500 people have been affected and have benefited from the establishment here of the Batesville White Lime Co."

Sand-Lime Brick Production and Shipments in September, 1935

THE FOLLOWING DATA are compiled from reports received direct from producers of sand-lime brick located in various parts of the United States and Canada. The accompanying statistics may be regarded as representative of the industry.

Ten active sand-lime brick plants reported for the month of September, this number being one less than the number reporting for the month of August, statistics for which were published in October.

Average Prices for September

Shipping Point	Plant price	Delivered
Pontiac, Mich.	$11.50	.....
Dayton, Ohio	13.00	14.00
Detroit, Mich.	.....	11.50
Grand Rapids, Mich.....	10.00	12.00
Mishawaka, Ind.	9.25	.....
Syracuse, N. Y.	14.00	16.00-20.00
Saginaw, Mich.	10.50	.....
Sioux Falls, S. D.	12.00	.....
Toronto, Ont., Can.	12.00	13.50

Statistics for August and September

	August†	September*
Production	1,973,665	2,395,515
Shipments (rail) ..	144,200	44,000
Shipments (truck).	1,873,453	1,893,551
Stocks on hand ...	1,920,609	2,201,734
Unfilled orders	1,012,000	720,000

†Eleven plants reporting; incomplete, two not reporting unfilled orders.
*Ten plants reporting; incomplete, two not reporting unfilled orders.

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Crume Brick Co., Dayton, Ohio, reopened its plant recently and is operating part time.

By-product Lime

Seattle Lime Co., Seattle, Wash., has established a plant to utilize hydrated lime sludge of a nearby acetylene plant. Andrew Schmid is proprietor. It is proposed to dry and market the product chiefly for agricultural use.

Lime Shipments

National Lime Association, Washington, D. C., reports shipments and average prices of lime for the three months May-July as follows:

Prices in July ranged from $5.05 per ton for agricultural quicklime in bulk to $17.38 for building quicklime in barrels.

TOTAL SHIPMENTS AND CAPACITY[1]

Month 1935:	Total capacity represented, short tons	Total shipments reported, short tons	Average value per ton	Ratio shipments to capacity, per cent — Lime manufacturing districts — United States	1	2	3	4	5B	6-8-9	7	10-11	12	13	14	15
May ...	275,501	115,446	$8.02	42.0	30.5	69.4	60.2	57.0	34.0	27.9	41.4	38.5	25.3	28.2	35.9	24.7
June ..	253,552	95,036	8.20	37.5	28.0	35.3	53.6	67.0	30.9	30.0	42.4	26.1	35.3		17.0	36.9
July ...	226,359	75,205	8.37	33.2	23.9	29.7	53.6	60.7	30.6	31.8	28.5	24.9	35.8		18.7	29.7

[1]All data relate only to competitive lime. Total capacity in the table includes the following capacity reported as idle: May, 9740 tons; June, 14,490 tons; July, 16,690 tons. Note that the ratios of shipments to capacity for Districts 12 and 13 have been combined for June and July.

Digest of Foreign Literature

By F. O. Anderegg, Ph. D.
Consulting Specialist, Long Island City, N. Y.

High Quality Cement Resistant to Sea Water. Wang Tao of Tangshan, China, reports on laboratory experiments on cements with sufficient iron added to reduce the tricalcium aluminate content to a very small figure. This cement compared favorably with standard portland when mixed with and stored in fresh water, but when gaged with and stored in sea water concentrated five times, it was much superior to the portland. In another experiment, 10, 25 and 50% of portland was replaced with shale calcined at different temperatures. The best calcining temperature was 600 to 700 deg. C. Shale calcined in this range and replacing 10 or 25% of the cement compared favorably with the latter in the small test specimens used, while even the replacing of half of the cement with shale showed only small reductions in tensile strength. On replacing 10% of the high iron cement with the shale still better results were obtained.

		Tensile Strength, lb. per sq. in.			
	Mixing and Storage	7	28	60	90
Cement	Water	Days	Days	Days	Days
Portland	Distilled	294	311	326	344
	conc. sea	141	90	106	94
Iron	Distilled	321	330	347	347
	conc. sea	180	191	254	267
Iron 90, shale 10	Distilled	351	386	404	430
	conc. sea	240	283	290	293

—*Tonindustrie Zeitung* (1935) **59**, No. 14, p. 178.

Portland Cement and Sulfuric Acid from Gypsum and Clay. A calculation of the heat balance for this reaction has been worked out by P. P. Budnikoff and M. P. Charkoff, using a rotary furnace for production. For the production of 100 kg. of clinker, 153 kg. of anhydrite, 31 of clay containing 6.8% moisture, 13.5 of coke and 19.7 of additional water are mixed together and on heating the sulfur is reduced to SO_2, producing 72 kg. The CO thus formed oxidizes to CO_2 giving up additional heat. Besides this, coal has to be burned to supply the balance. The heat requirements are: vaporization of the water added and of that in the clay, 13,748 Cal.; dissociation of $CaSO_4 + C = CaO + CO + SO_2$, 97,792 Cal.; heating waste gases to 750 deg. C., $2252\ X + 37{,}620$, where X is the coal requirement; heating the water vapor, 6436; loss in the clinker leaving the cooler at 100 deg., 1989; radiation and convection loss from the kiln, 47,000 and from the cooler, 3160 Cal.; with a sum of $206{,}063 + 2252\ X$. The CO by-product from the main reaction yields 68,220 Cal., while 1660 Cal. are recovered from the clinker cooler, so that the equation becomes $7188\ X + 77{,}172 = 206{,}063 + 2252\ X$ and $X = 26$ kg. coal required, in addition to 13.5 kg. of coke breeze in the raw mix.

The gases leaving the kiln contain at 750 deg. C. 7.1 volume per cent of SO_2. They are partially cleaned in a cooling chamber and it is possible to use this heat for calcining plaster, or for preheating the air which might be used for drying the raw mix. The gases are passed through a Cotrell precipitator and then the SO_2 is oxidized to sulfuric acid either in a Peterson tower or by the contact process with a vanadium catalyst, after more air has been added. *Tonindustrie Zeitung* (1935) **59**, No. 6, p. 65.

Relation Between Mortar Strengths of Cement and the Compressive Strength of Plastic Concrete—This problem, which has received so much attention in the United States, has been carefully studied by A. F. Roscher-Lund of the Norges Tekniske Höiskóle, Trondheim, Norway. There should be available a simple test involving mortar, from which accurate concrete strengths should be predictable. The causes of deviation are numerous but are reduced by staying within the region of plastic consistency. Nevertheless sufficient variables occur to reduce the value of any simplified formula. For calculating concrete strength from mortar strength a formula is proposed which has given better correlation than the previous formulas of Feret, Abrams, Graf or Bolomey:

$$\text{Concrete compressive, } C = aMZ \frac{1}{1 + s_c W}$$

where a is a constant for the given materials and conditions, M is the mortar strength, Z the amount of cement per cubic yard, s_c is the specific gravity of the cement, and W is the water-cement ratio by weight. This formula holds for portland and certain special cements, when the cement content varies between 3 and 7 bags per cubic yard, where 8-in. cubes are damp cured and for a fineness modulus lying between 4.5 and 6. It also holds only for practical, workable mixes. By careful choice of aggregate, grading, size of specimen and curing conditions, mortar and concrete strengths can be calculated from the same formula.

Mortar specimens are prepared as follows: the sand, one part fine (nearly all lying between 50- and 100-mesh sieves) and two parts standard sand and the cement shall be weighed into a trough and mixed dry for one minute. The water shall be added and the mixing continued with the hand scoop for three minutes. The slump test shall be made with a truncated cone 12 cm. high having diameters 4 and 8 cm. and the mortar shall be molded with the aid of a 6-mm. rod. After filling allow to stand for 30 seconds and remove the mold. The slump shall be 9 cm. If necessary more water is added, the mortar is mixed for another minute and the slump test repeated. The time between adding water until placing in the cube mold shall be at least 8½ min., during the last minute of which the mortar shall be continuously mixed. It shall be filled into 7.07 cm. cubes with the scoop, the excess being struck off with knife or trowel, being careful to apply no pressure. After standing 24 hours the specimens are stored in water at 15 to 18 deg. C. and five are broken at 3, at 7 and at 28 days.

Concrete specimen specifications follow: The moisture content of the aggregate shall be determined and allowed for when adding water. The dry materials shall be mixed for two minutes in an iron pan and after adding the necessary water, mixing shall be continued for three minutes. The mix is then placed in a slump cone of 30 cm. height as with the mortar, allowed to stand one minute before raising the cone. The slump shall be close to 15 cm. Finally after adjusting the water to provide this slump, the concrete shall be mixed thoroughly for one minute and filled into a 20 cm. cube in two layers with light tamping. Ten minutes shall elapse between addition of the water and filling the cube form. After stripping the form the next day the cubes shall be weighed and stored in damp sand for 7 or 28 days.—*Zement* (1935) **24**, No. 6, p. 83; No. 7, p. 97.

The Effect of Temperature and Time of Hardening on the Strength of Sand-Lime Brick. Hugo Ippach made up small specimens of sand passing 250-mesh with fine lime and water 5:5:7 by weight and packed into a 3-in. cube mold and indurated in a small autoclave. A large number of experiments was carried out at 2.0, 3.6, 6.1, 9.9 and 15 atmospheres, the time of steaming varying up to 6 days. While considerable scattering occurred on determining the compressive strength, the following conclusions seem to be justified: A maximum strength was reached of 2800 to 3000 lb. per sq. in. beyond which further heating had, if anything, a slightly detrimental effect. An optimum pressure of about 10 atmospheres was noted, higher pressures producing lower strengths. The lower the temperature the longer the time for reaching maximum strength, thus at 2 atmospheres it seemed to require 8 to 10 times as long as at 10 atmospheres. *Tonindustrie Zeitung* (1935) **59**, No. 8, p. 91.

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of October 19.

New England

36913. To cancel commodity rate of $1.60 per net ton on **stone,** viz., granite, grout, from E. Barre, Graniteville and Websterville, Vt., to Hampton, N. H., as published in Item No. 320 of St. J. & L. C. R. R. I. C. C. 38, and apply in lieu thereof class rates or combination rates.

36930. To revise Item 300 of St. J. & L. C. R. R. I. C. C. 38, naming rate of $1.40 net ton on **stone,** crushed or broken, from Barre, Vt., to St. J. & L. C. R. R. stations, also rate of $1.90 per net ton, from Barre, Vt., to Windsor, Vt., by restricting the non-application of the emergency charges to apply only in connection with the rate of $1.40 from Barre, Vt., to St. J. & L. C. R. R. stations. Reason: Addition of emergency charges.

37220. **Stone,** viz., rip rap, carload, (See Note 2), West Chelmsford, Mass., to Sagamore, Mass. Proposed, $1.20 per ton of 2000 lb. Reason: To enable rail carriers to receive a haul on this traffic.

Trunk

Sup. 2 to 33958. **Silica sand,** C. L., (See Note 2), from Hancock and Round Top, Md., to Georgetown, Ont., $3.70 per net ton.

Sup. 1 to 33980. **Fluxing stone and crude or raw dolomite,** carload, to Alloy, W. Va., from Lebanon Valley district, $2.88 per gross ton on fluxing stone, and from Williams, Penn., $3.21 on fluxing stone, and $3.53 per gross ton on crude or raw dolomite.

Sup. 2 to 33980. **(A) Fluxing stone,** C. L., **(B) dolomite, crude or raw,** C. L., (See Note 2), to Alloy, W. Va., from Billmyer, Penn., $2.88 per gross ton on (A) and $3.20 on (B), from Blue Bell and Williamson, Penn., $3.21 on (A) and $3.53 on (B), and from York, Bellefonte, Pleasant Gap, Penn., and Inwood, W. Va., $2.60 per gross ton on (A).

Sup. 3 to 33980. **Fluxing stone,** C. L., from Bittinger, Thomasville, Penn., and Cavetown, Md., to Alloy, W. Va., $2.60 per gross ton.

Sup. 4 to 33980 (cancels Sup. 2). **(A) Fluxing stone,** carload; **(B) dolomite,** crude or raw, carload, (See Note 2), to Alloy, W. Va., from Billmyer, Penn., $2.88 per gross ton on (A) and $3.20 on (B), from Blue Bell, Penn., (A) $3.21 and (B) $3.53, and from Williamson, Penn., York, Bellefonte, Pleasant Gap, Penn., and Inwood, W. Va., $2.60 per gross ton on (A).

Sup. 2 to 33985 (cancels Sup. 1) **(A) Sand** (other than ground or pulverized) in closed cars, or in open top cars with tarpaulin or other protective covering, C. L., **(B) sand,** naturally bonded molding, in open top or closed cars, C. L., **(C) ground sand,** C. L., (See Note 2), rates from Carrollton, Vandalia and Olean, N. Y., and southern New Jersey groups to St. Catharines and Hamilton, Ont., various rates from $2.10 to $4.53 per net ton.

Sup. 1 to 33999. **Ganister rock,** not ground, C. L., (See Note 3), from Berkeley Springs, W. Va., to Economy and Aliquippa, Penn., $1.86 per net ton.

Sup. 1 to 34000. **Slag,** C. L., (See Note 2), from Troy, N. Y., to Burlington, Vt., $1.85 per net ton.

34004. **Sand** (other than ground or pulverized or naturally bonded molding), and **gravel,** in open top cars, without tarpaulin or other protective covering (See note 2), from Farmingsdale, Lakewood, Pinewald, Quail Run, South Lakewood, Toms River and Whitings, N. J., to Clinton, N. J., $1.30 per net ton, subject to emergency charge.

34008. **Stone,** crushed, coated with tar, oil, asphaltum or similar bituminous materials, in open top equipment, in straight carloads*, from Bound Brook, N. J., to Ringoes and Copper Hill, N. J., $1.03, and Rocky Hill and East Millstone, N. J., $1.33 per net ton.

34014. **Crushed stone,** carload (See Note 3), from Hopatcong Jct., N. J., to Seaboard, N. J., $1.10 per net ton.

34023. Publish same rates on **crushed stone,** C. L. (See Note 3), from Security, Md., to stations on the Washington & Old Dominion Railway, as now applicable from Martinsburg, W. Va.

Sup. 1 to 34023. **Crushed stone,** carload, (See Note 2).

To (W. & O. D. Ry.)	(1)	(2)
Falls Church, Va.	120	120
Vienna, Va.	120	130
Ashburn, Va.	130	130
Bluemont, Va.	140	140

Rates in cents per 2000 lb.

(1) Proposed rates, from Texas and Cockeysville, Md.
(2) Proposed rates, from Bluemont, Md.

34026. **Crude fluxing limestone,** C. L. (See Note 3), from Bellefonte and Pleasant Gap, Penn., to Painted Post, N. Y., $1.79 per gross ton.

34031. **Sand,** in open or closed cars (See Note 3), from Dunbar, Penn., to Niagara Falls, Ont., $2.90 per net ton.

34034. Increase the minimum weight on **limestone,** pulverized, precipitated, and limestone dust, in straight or mixed carloads from Buffalo, N. Y., to stations on the Arcade & Attica R. R., from 50,000 lb. to 60.000 lb. Reason — To provide uniform minimum weight.

34035. **(A) Sand** (other than ground or pulverized or naturally bonded moulding), and **gravel,** in open top cars, C. L.; **(B) sand,** naturally bonded moulding, in open top or closed cars, C. L., from Flanders, Hopatcong Jct. and Kenvil, N. J., to Bayonne, N. J., $1.20 per net ton.

34055. **Stone,** crushed, coated with tar, oil, asphaltum, in bulk, in open top equipment, in straight carloads* (See Note 2), from Bound Brook, N. J., to Erie R. R., N. Y. S. & W. R. R. and N. R. R. of N. J. stations, Weehawken, Little Falls, Pompton, Passaic, Newark, Paterson, N. J., Blauvelt, Tuxedo, Newburgh, Florida, Port Jervis, N. Y., Lodi, Butler, Hamburg, N. J., Stroudsburg, Penn., New Durham, Englewood, N. J., Nyack, N. Y., and various, rates ranging from $1.33 to $1.73 per net ton, subject to emergency charge.

34079. **Limestone, ground or pulverized.** C. L., minimum weight 60,000 lb., to Hickory Valley Railroad stations. Proposed rates in cents per 2000 lb.: From Bellefonte Group, 220; Chester Valley Group, 290; Frederick Group, 280; Lebanon Valley Group, 260; Martinsburg District, 280; York District, 260; Texas Group, 280; Billmyer Group, 260.

34083. **Stone, natural** (other than bituminous asphalt rock), crushed, carload. (See Note 2), from Nazareth, Penn., to Seabright, N. J., $1.50, and Manasquan and Point Pleasant, N. J., $1.40 per net ton.

34088. **Stone,** crushed, coated with tar, oil or asphaltum, in bulk in open top equipment, in straight carloads* (See Note 2). From Canoe Creek Stone Co., Penn., to B. & O. R. R., C. & I. R. R. and H. & B. T. M. R. R. stations Hyndman, Rockwood, Walsall, Connellsville, Witmer, Nansen, Ernest, DuBois, Hutchins, Colver, Brumbaugh, Penn., rates ranging from $1.18 to $1.83 per net ton, subject to emergency charge.

34095. **Crushed stone and screenings,** in straight or mixed carloads, (See Note 2), from Wertz and Frankstown, Penn., to points in Maryland, proposed rates of 120c to 140c per 2000 lb.

34096. To make change in connection with local switch movements of **sand, gravel and crushed stone,** carloads, between points within the switching limits of Cumberland, Md., from Rock Cut, Md., to Sidings and Team Tracks in Cumberland, Md., proposed 810, applies on traffic that has not had and will not receive a line haul. Rates in cents per car.

34097. **Gravel, sand, slag and crushed stone,** coated with oil, tar, asphaltum, in bulk in open top equipment in straight carloads.* (See Note 2), from Greer, W. Va., to stations on the Baltimore & Ohio Railroad in states of Maryland, Pennsylvania and West Virginia, rates on mileage basis starting with 73c per 2000 lb. for 20 to 39 miles.

34098. **Crude fluxing limestone,** carload, (See Note 2), from Bellefonte, Pleasant Gap and Chemical, Penn., to Wheeling, W. Va., $1.26 per gross ton, subject to emergency charge.

Central

43984. (Cancels W. D. A. 43310 and 43744)—To establish on (A) **Limestone,** unburned, agricultural, in bulk or in bags, in box cars, minimum weight 60,000 lb. (B) **Limestone,** unburned, agricultural, minimum weight 50,000 lb. (C) **Limestone,** agricultural, in bulk in open top cars, from Genoa, Martin, Danbury, Marblehead, Gibsonburg and Woodville, O., to points in Indiana, rates ranging from 115 to 240c per net ton.

44160. To establish on **limestone,** unburnt, ground or pulverized, C. L., minimum weight 60,000 lb., from Gibsonburg and Woodville, O., to Laurens, S. C., 385c per net ton.

44303. To establish on **waste stone,** viz., breakwater, chips, grout, rip rap and spauls C. L. (See Note 3), from the Bedford-Bloomington, Ind., stone district to Michigan City, Ind., 125c per net ton, plus emergency charge.

44317. To establish on **crushed stone and crushed stone screenings,** in bulk, from White Sulphur and Scioto, O., to Ridgeway, Horton, W. Mansfield, O., 60; Lunda, Raymonds, Peoria, Dipple, Arnold, Kile, O., 50, being proposed rates in cents per net ton. Route: Via C. C. C. & St. L. Ry., Marysville, N. Y. C. R. R.

44320. To establish on **crushed stone,** carload, from White Sulphur and Scioto, O., to Cleveland, O., 90c per net ton. Route: Via C. C. C. & St. L. Ry., direct.

4331. To establish on **sand and gravel,** carload, from Marion Sand and Gravel Co., located at Marion, O., on the Erie R. R., to the Millard Hunt Co. (mixing plant), located at Marion, O., on the Erie R. R., switching rate of $6.30 per car.

44336. To establish on **stone, sugar,** carload (See Note 3), from Keeport, Ind., to Paulding, O., 100c per net ton. Route: Via Wab. Ry., Cecil, O., Cin. Nor. R. R.

44347. To establish on **agricultural limestone,** unburnt, carload, in closed equipment, minimum weight 60,000 lb., from Piqua, O., to Detroit 155c, Grand Rapids 175c, Jackson 155c, Lansing 165c, Marysville 170c, Plymouth 155c, and St. Joseph, Mich., 165c per net ton.

44348. To establish on **agricultural limestone,** unburnt, in open top cars, carload, from Marion, O., to destinations in Ohio, various rates ranging from 70 to 135c per net ton.

44351. To establish on **dolomite, roasted,** carload, from Woodville, Maple Grove, Narlo and Bettsville, O., to Pueblo and Minnequa, Colo., 680c per net ton.

44352. To establish on **sand** (other than blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), and **gravel,** in open top cars, carload, from Beach City, O., to Akron 60c, Cleveland 75c, Rittman 60c, Lodi 80c, Wooster 80c, Newton Falls 90c, Warren 95c, Girard 95c, Niles 95c, Youngstown 95c, and Mineral City, O., 60c per ton 2000 lb., subject to tariff of emergency charges.

44494. To establish on **sand,** viz., blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding

*Note—The oil, tar and/or asphaltum not to exceed 10% by weight of the commodity shipped, the shipper to so specify on shipping orders and bills of lading.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

or silica, in open top cars, C. L., from Huron and Milan, O., to Columbus, O., rate of 90c per net ton, plus emergency charge.

44530. To establish on **stone, fluxing, furnace or foundry, melting** and/or refractory (unburned), in bulk (ex-lake), C. L., from Painesville and Perry, O., to Bellaire, O., Benwood, Follansbee, W. Va., Martins Ferry, Mingo Jct., Steubenville, Toronto, O., Weirton and Wheeling, W. Va., 113c per gross ton.

44534. To establish on **stone,** crushed, **slag** and/or **gravel,** coated with oil, tar or asphaltum* in open top cars, in straight or mixed carloads, from Martins Ferry, O., to Bergholz, O., 128c per net ton, subject to provisions of the Emergency Charge Tariff.

44559. To restore rates on **sand,** blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica, C. L., (See Note 3), formerly published in Item 95, C. F. A. L. Tariff 348H, viz.:

44562. To establish on **crushed stone,** in open top cars, C. L., actual weight will apply, from Thrifton, O. (rates in cents per net ton): To Lowell, O. 125; Waterford, O., 135; Swift, O., 135; Brokaw, O., 125; Malta, O., 125; Eagleport, O., 125; Stone, O., 115; Zanesville, O., 115.

44575. To establish on **crushed stone** and **crushed stone screenings,** in bulk, in straight or mixed carloads, in open top cars, (See Note 3), Scioto and White Sulphur, O., to Crestline, O., 80c per net ton. Route: Via C. C. C. & St. L. Ry.

44576. To establish on (A) **sand,** naturally bonded moulding, in all kinds of equipment; sand (except naturally bonded moulding; ground or pulverized sand) in closed equipment; (B) sand, ground or pulverized, in all kinds of equipment; and (C) sand (except naturally bonded moulding; ground or pulverized sand), in open top equipment, carload, orders will not be accepted for closed and open top cars of less marked capacity than 60,000 lb. and 80,000 lb. respectively, from the Conneaut, Sandusky, Oil City and Southern Ohio groups to points in Wisconsin and Minnesota shown, rates based upon the mileages, applied to scale in I. C. C. Docket 22907.

44614. To establish on **sand and gravel,** C. L., from New Albany and Newport Sand Bank Spur, Ind., to destinations in S. F. A. territory, same rates as in effect from Louisville, Ky., to points in S. F. A. territory, published in Agent Young's Tariff 388-A.

Southern

9537. **Feldspar,** C. L., Erwin, Tenn., Minpro, Spruce Pine, Toecane, Bowditch and Cane Branch, N. C., to Southwestern territory, to establish rates on feldspar, C. L., minimum weight 50,000 lb., from the above named origins to specified points in Southwestern territory, made 14% of first class.

9646. **Phosphate rock and phosphatic limestone,** C. L., L. & N. R. R. and N. C. & St. L. Ry. stations in the Mt. Pleasant-Centreville district to Buffalo, N. Y., Chicago, Chicago Heights, Joliet, Ill., Cleveland, Sandusky, Toledo, Ohio, and Detroit, Mich., and intermediate points on the direct routes. To extend the expiration date in connection with the rates in question to Dec. 31, 1936.

9653. **Feldspar,** C. L., Gretna, Va., to Trenton, N. J. To establish rate of 481c per net ton on **feldspar,** in packages, or in bulk, C. L., minimum weight 50,000 lb., from and to points mentioned.

9696. To establish the same rates on **ground** or **pulverized limestone** in open top equipment between points in Florida as are applicable on crushed stone.

9781. **Limestone, ground, including limestone dust or screenings** (agricultural limestone), C. L., Krause, Ill., to M. & O. R. R. and O. H. & C. C. Ry. Mississippi Valley common and local points. To reduce the carload minimum weight, in bulk, in open cars, from Note 1 basis to Note 3 basis.

9792. **Stone,** viz., paving, curbing, flagging and bridge stone, C. L., for export or coastwise movement. To establish the rates, C. L., from Conyers, Lithonia, Redan and Stone Mountain, Ga., to Norfolk, Newport News, Pinners' Point and Portsmouth, Va., 315c per net ton (includes wharfage charge of 20c per net ton); to Charleston, S. C., and Savannah, Ga., 169c per net ton.

Western

D-41-110. **Sand,** molding, C. L., (See Note 3), from Boulder, Lafayette, Louisville and Superior, Colo. Proposed, 20c per 100 lb., to Chicago, Ill.; Des Moines, Ia.; Kansas City, Mo.; Leavenworth, Kan., and Omaha, Neb.

E-41-112. **Asphalt rock,** natural or coated with not to exceed 5% of road oil, crushed or ground, straight loads or mixed carloads with stone, coated with not to exceed 5% of road oil, crushed or ground. Chatts, gravel, sand or stone, crushed or ground, coated with not to exceed 10% of oil, tar, or asphalt (asphaltum), in straight or mixed carloads. Between points in the states of Kansas, Missouri and Oklahoma on intrastate and interstate traffic. Proposed—to establish a uniform mileage scale of commodity rates, based upon a ten cent arbitrary over the present S. W. L. 162-I mileage scale of rates applicable on crushed stone.

E-41-113. **Stone,** crushed, as described in W. T. L. Tariff 111-I, from Canon City, Denver, Colo., and points in Group B to points in Groups 1, 3 and 7. Minimum weight proposed—50,000 lb.

C-41-114. **Sand,** moulding, (See Note 3). In no case shall the minimum weight be less than 40,000 lb., from Twin Cities, Minn., to Charles City, Iowa. Rates: Proposed—7c per 100 lb.

D-41-116. **Sand** (except asbestos sand and silica sand), and **gravel,** in straight or mixed carloads, (See Note 3), from Wichita, Kan., to Augusta, Kan. Proposed—40c per net ton.

C-41-118. **Limestone,** crushed or ground, C. L., from Louisville and Weeping Water, Neb., to Chicago, Ill. Proposed—13¾c per 100 lb. Minimum weight, proposed (See Note 3), but in no case less than 40,000 lb., in open top cars, or 54,000 lb. in cars other than open top or tank cars.

Southwestern

6199. To establish rate of $1.55 per ton of 2000 lb. on **silica sand** in box cars, carload, minimum weight as provided in Item 60 of S. W. L. Tariff No. 162-I, from Crystal City and Festus, Mo., to Kansas City, Mo.

6227. To establish rates in cents per ton of 2000 lb. on **molding sand,** carloads, from Boulder, Louisville, Lafayette and Superior, Colo., to Dallas-Ft. Worth group, 500; Texas common point group, 525; El Paso, Tex., and points grouped therewith, 525; Texas differential group, 575. Also to establish rates from Denver, Colo., 25c per ton less than those shown above.

6266. To establish rate of 68c per ton of 2000 lb. on **sand and gravel,** etc., as described in Item 40 of S. W. L. Tariff 162-I, from St. Louis, Mo., to Crystal City, Mo.

6281. **Stone, crushed, chatt, gravel and sand,** Pixleys, Mo., to Missouri and Kansas. Add Pixleys, Mo., on Kansas City basis on crushed stone, coated with asphalt, tar or oil, same as now applies on sand and gravel.

6316. Propose to establish rate of $3.53 per ton of 2000 lb., minimum weight 100,000 lb., on **chatt sand,** carloads, from Cave Springs, Mo., Chitwood, Mo., Galena, Kan., and Joplin, Mo., to Heltonville, Ind.

6317. To establish rates on **crushed stone,** Moline, Kan., to Arapaho, Okla., $1.47, Custer City, Okla., $1.42, to meet reduced rates in effect from Betts, Okla.

6389. To establish specific rates on **asphalt rock,** carload (See Note 1), from Dougherty, Okla., to points on M.-K.-T. of Texas, as follows: To Lewisville, Tex., 130c per ton; to Nocona, Tex., 120c per ton.

6406. To establish specific rates on **crushed stone,** carload (See Note 1), from Stringtown, Okla., to points on M.-K.-T. of Texas, as follows: To Lewisville, Tex., 93c per ton; to Nocona, Tex., 95c per ton.

6420. To establish a uniform mileage scale of commodity rates applicable on **asphalt rock,** natural or coated with not to exceed 5% of road oil, crushed or ground; and on asphalt coated **chatts, gravel, sand** or **stone,** crushed or ground, coated with not to exceed 10% of oil. tar or asphalt in straight or mixed carloads, between points in Kansas, Missouri and Oklahoma via present established routes.

6529. To establish specific rate of 227c per ton of 2000 lb. on **asphalt rock,** crushed, carload. (See Note 1), from Dougherty, Okla., to Hart, Tex., on the F. W. & D. C.

I. C. C. Decisions

26835. Talc. Illinois Paint Works vs. N. Y. C. By division 4. Complainant entitled to reparation on finding carload rate from Hailesboro, N. Y., to Chicago, Ill., unreasonable to extent it exceeded 32c, minimum 60,000 lb., on shipments delivered between May 3, 1932, and September 21, 1933.

Fourth Section Orders 10599 and 11961. Cement. By the Commission. Covering applications 13968, 13425, 14236 and 15034. Relief granted to carriers from the long-and-short haul part of section 4 in a part of central freight association territory, trunk line territory and in New England. In case 13425, the Commission modified a prior order so as to provide that the circuity limitations imposed should be based on the distance over the short line instead of the rate-making distance.

26758. Sand. Hartford Electric Steel Corp. vs. Pennsylvania, et al. By division 4. Carload rate, Millville and Manumuskin, N. J., to Hartford, Conn., unreasonable to the extent it exceeded $3.50 a net ton between April 21, 1931, and July 1, 1935. Reparation awarded.

15144. Cement. By division 2. Authority granted to establish rates from points in central and trunk line territories to destinations in West Virginia without observing the long-and-short haul provisions of section 4, subject to circuity and combination limitations.

26534. Silica Sand. Standard Sanitary Manufacturing Co. vs. C. & E. I. et al. By division 4. Complainant entitled to reparation on finding rate from Ottawa, Ill., to Louisville, Ky., unreasonable to extent it exceeded $2.64 over routes less than 15% longer than the shortest existing route over which carload traffic could be moved without transfer of lading, and to the extent it exceeded $2.80 over other routes over which the distance did not exceed 400 miles.

26596. Sand (other than silica and naturally bonded molding sand). Norcross Bros. vs. Pennsylvania. By division 4. Rates from Birmingham and South Pemberton, N. J., to Philadelphia, Penn., and nearby points found unreasonable to the extent they exceeded rates based on the scale in Buckland case, 139 I.C.C. 88. Lower intrastate rates on like traffic from plants of competitors at Morrisville, Penn., declared to cause undue prejudice to complainants. Rates on gravel and on sand and gravel over same territory not shown unreasonable.

15909. Limestone, unburnt, ground, or pulverized. By division 2. Authority granted to establish rates from Buckeystown, Eagle's Mills, Frederick, Grove, Keller, Lime Kiln and Security, Md., Capon Road, Cedar Creek, Middletown, Oranda, Stephens City, Vaucluse and Winchester, Va., Alba-Marl Lime Co., Charles Town, Engle, Kearneyville, Martinsburg, Millville, Natural Lime-Marl Co.'s Siding, W. Va., to points in North Carolina without observing the long-and-short haul provision.

26640. Crushed Stone. Currie Construction Co. et al. vs. C. B. & Q. et al. By division 5. Dismissed. Rate and switching charge from Quartzite, Minn., to Creston, Iowa, applied on shipments between October 1 and December 15, 1931, found not unreasonable.

17822. Sand. River Raisin Paper Co. vs. C. B. & Q. et al. By the Commission. On further hearing, amounts of reparation due under prior findings, 188 I. C. C. 99, silica sand from Ottawa, Ill., district to Monroe, Mich., and Toledo, Ohio, determined and ordered to be paid not later than November 1.

Cement Products

A transit mixed truck being loaded

DETROIT BUILDING STIMULATES MIXED CONCRETE BUSINESS

THE growing demand for new buildings in cities—both residential and commercial—is going to prove that ready-mixed concrete has come into its own, if experience at Detroit is a criterion.

Detroit Transit Mixed Concrete Company

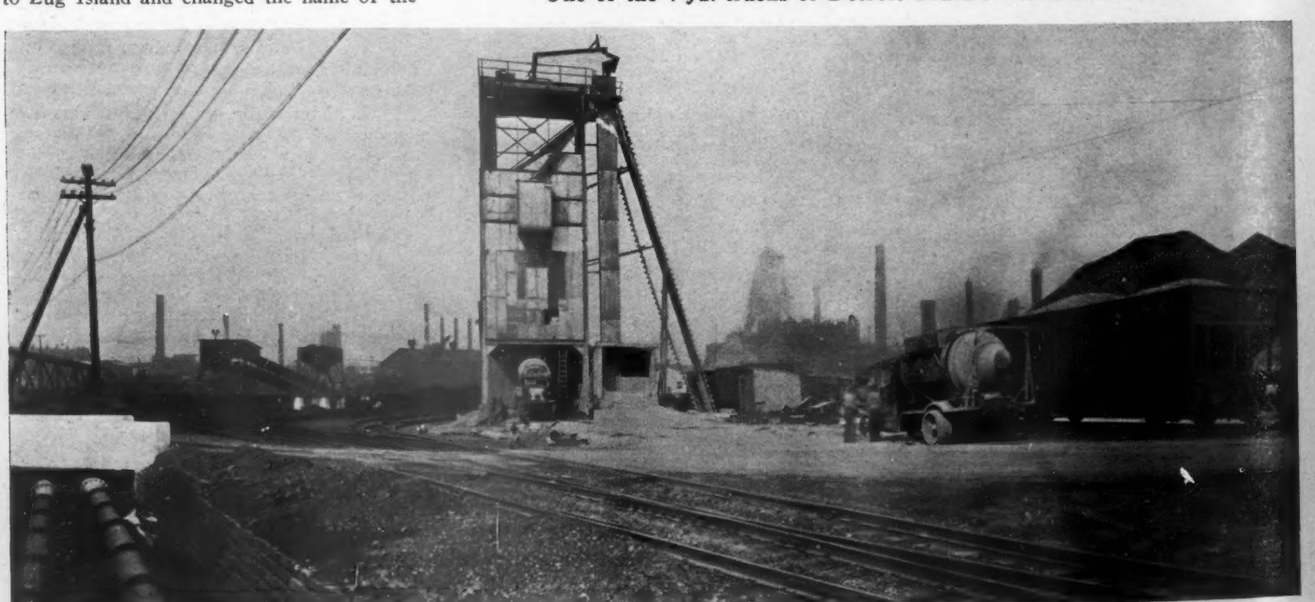
J. K. Wing Co. recently moved its plant to Zug Island and changed the name of the operation to the Detroit Transit Mixed Concrete Co. J. K. Wing is president; Robert Oakman, vice-president, and Harry S. Stark, secretary and treasurer.

Coarse aggregate is screened and sized crushed slag, purchased from the Great Lakes Steel Co., whose plant is also on Zug Island. Sand is delivered by water to a harbor yard nearby. Both slag and sand are delivered to the plant hopper in bottom-dump railway cars.

A 75-ft., c. to c., bucket elevator with 2½ x 1-ft. buckets takes the aggregates from the track hopper to the tops of the Butler bins, which have three compartments, two for coarse aggregate and one for sand, with a total capacity of 500 tons. Cement is placed in a 250-bbl. bin by a bucket elevator, and another 75-bbl. bin is provided for high early strength or other special cement. Batches are weighed on an American Kron dial scale. A heating plant is provided for cold weather.

The truck mixer fleet consists of 19 Paris

One of the 4-yd. trucks of Detroit Transit Mixed Concrete Co.



View of ready-mix plant and trucks of Detroit Transit Mixed Concrete Co. Cars for unloading slag and sand into hopper are on right. Great Lakes Steel Co. plant is in background

New Butler ready-mix plant at Detroit yards of Koenig Coal and Supply Co. Truck on left is loading. Car on right is emptying into hopper which feeds bucket elevator

and 1 Jaeger trucks; four are 3-cu. yd. capacity and the others 4 and 5 cu: yd. The plant has a capacity of 600 cu. yd. per 10-hour day.

Koenig Coal and Supply Company

A new concrete batching plant was recently erected at its Detroit yard by the Koenig Coal and Supply Co., large producer of sand and gravel as well as builders' supply dealer. Sand and gravel are brought by rail from the company's plant at Oxford in bottom-dump cars. The 8-cu. yd. receiving hopper is served by a 2½ x 1-ft. bucket elevator, 80 ft. centers, which discharges through a turn table spout to one of four bins. A 30-in. belt conveyor, 10 ft. centers, feeds from the track hopper to the elevator.

The bins and accessories are Butler made. The four aggregate bins hold 80 tons each, two for sand and two for coarse aggregate. Cement is placed in a 200-bbl. bin by a bucket elevator. An additional 100-bbl. bin is provided for high early strength or other special cement. Water for each batch is stored in a 290-gal. tank. In cold weather both aggregates and water are heated.

Delivery and mixing are done with ten 4-cu. yd. Jaeger truck mixers.

Pipe Maker Expands

Grey Concrete Pipe Manufacturing Co., Baltimore, Md., is erecting five 1-story metal and concrete-block buildings as an expansion of its plant.

Concrete Products Demand in Hawaii Grows

Honolulu Construction and Draying Co., Honolulu, H. I., has purchased the plant and equipment of the Cement Products Co. and will continue operation with the same operating personnel. The new owners will develop a full line of concrete products.

New Products Plant

Americus Concrete Works, Americus, Ga., has been organized by J. A. McLain and C. L. Bennett. They will manufacture burial vaults and a full line of concrete products.

Another view of Koenig Coal and Supply Co.'s new ready-mix plant. The stack on the right is from boiler used in winter to heat water and aggregate in bins

New Machinery and Equipment

Bar Screen

ALLIS-CHALMERS MANUFACTURING CO., Milwaukee, Wis., announces an improved bar screen or grizzly, known as its "Cantilever" screen. Advantages claimed for it are: "Bars fixed only at head end; absence of bar tie rods at the lower

Improved grizzly

end eliminates the clogging often experienced there with ordinary types of bar screens. The impact of the material on the grizzly causes the overhung free ends of the bars to vibrate horizontally keeping the material from wedging. Thus with higher efficiency it can handle large tonnages more effectively. Has the advantages of simplicity, low first cost, low maintenance cost, ease of operation, ease of repairs and the fact that there are no moving parts that require power. The most common use for Cantilever grizzlies is for separating fines from crusher feeds of various kinds. Available with openings from 1 in. to 3 in. between bars according to individual requirements. The bars are tapered in section and made of high quality manganese steel to resist wear."

Hoisting Machinery

LIDGERWOOD MANUFACTURING CO., Elizabeth, N. J., has acquired the J. S. Mundy Hoisting Engine Co., Newark, N. J., and will continue the manufacture of the Mundy line of hoisting equipment as well as service Mundy machinery now in the field. The plant will continue under the Mundy company name.

Belt cutter

Brake Lining

THERMOID RUBBER CO., Trenton, N. J., announces "Thermoid BX Woven," for use on heavy industrial machinery and equipment. This brake lining has as its base asbestos tape that is woven in a single thickness and therefore has no plies to separate under service conditions. This tape is woven of heavy yarn containing brass wire and is impregnated with a highly heat-resistant Bakelite resin. The resultant product is a dense, flexible material consisting of 70% asbestos and 30% resin. It is ground on the wearing surface, ready for application. Additional claims made by the manufacturer are: "This lining has a very high coefficient of friction under all conditions of service; gives quick deceleration and 'high holding'; stands heats above 900 deg. F. without deteriorating; no deterioration nor material decrease in efficiency in the presence of oil, grease or water; flexes quickly to the drum flanges and does not score them."

Dense, flexible brake lining

Belt Cutter

FLEXIBLE STEEL LACING CO., Chicago, Ill., has announced a belt cutter said to employ a new principle in belt cutting. It handles belts up to 8 in. wide. The special alloy steel knife is mounted on a plunger in a slot and is operated by a direct arm push, without mechanical leverage. The belt is held by an equalizing clamp while the cut is being made. The weight of the device (aluminum alloy) is 4 lb. 3 oz.

Trailer for Shovel

HARNISCHFEGER CORP., Milwaukee, Wis., has a new P&H "Bantamweight" trailer for transporting its Bantamweight shovel, introduced earlier in the year. By removing the front axle and placing ramp blocks the shovel crawls on the trailer, which has a 174-in. wheel base.

Trailer for lightweight shovel

Cement Pumps

FULLER CO., Catasauqua, Penn., has acquired the exclusive rights to the "Fluxo" system of conveying cement and other pulverized materials in the United States and possessions, Canada and Mexico, from F. L. Smidth & Co., New York City.

Pneumatic Tool Hose

MECHANICAL GOODS DIVISION of the United States Rubber Products, Inc., announces a new type hose for compressed-air drills and tools. The outstanding feature is the special construction—"tire like" cords laid in tough rubber cushions isolated from adjacent plies to prevent rubbing or shearing. It is claimed to be remarkably resistant to external blows, bruises and abrasions, due not only to its internal structure, but because of a specially compounded brown rubber cover, made of the finest oil-resistant rubber.

Hard Surfacing Electrode

A HARD SURFACING ELECTRODE, designed to build up straight carbon steel, low alloy or high manganese steel surfaces to resist abrasion is announced by the Lincoln Electric Co., Cleveland, Ohio. This new electrode, known as "Abrasoweld," is said to be of particular value in restoring teeth, lips and bottoms of power shovels; lugs of tractors; housings and impellors of

Dumping doors of trailer swing below wheels

centrifugal sand pumps. The electrode provides a deposit of abrasion-resisting alloy of the self-hardening type which surface hardens very rapidly under conditions of impact and abrasion.

Automatic Bottom-Dump Trailer for Quarry Transportation

SANDFORD-DAY IRON WORKS, INC., Knoxville, Tenn., has developed a trailer, or 6-wheel truck body, holding 17 tons, which is being used for handling coal in strip mining; and at least one cement company is installing this device to handle stone from quarry to crusher. This company has long made automatic bottom-dump rail cars for coal mines.

The trucks require no power device either on the truck or at the crusher to dump them. The free edge of the bottom door is below the level of the bottom of the trailer wheels when the door is wide open. In other words, the closed doors are very close to the road, and the trailer has a low center of gravity. Because of this arrangement of doors, it is necessary to provide a dumping bin or hopper where there is sufficient clearance for the doors to swing down into the wide open position.

At the approach end of the hopper and at the side of the roadway there is located a simple device which trips the latch lever as the trailer moves along the roadway. Another device is placed in the middle of the roadway at the exit end of the hopper, and, as the trailer passes over this device, the doors are raised into their closed position and relatched. The only power required for the dumping operation is, therefore, simply the power needed for moving the trailer along the roadway. It is not necessary to stop the trailer at any time during the dumping operation.

A model of the device was exhibited at the recent show of the metals division of the American Mining Congress at Chicago and it attracted much attention from open-pit miners.

A New Welding Electrode

ARC WELDING ELECTRODES, designated as G-E Type W-23 and recommended for the fabrication of pressure vessels, pipe, machinery and all joints where welding can be carried out in the flat position, has been announced by the General Electric Co., Schenectady, N. Y. Economy in the production of high-quality welds is provided, according to the manufacturers, by the ability of Type W-23 electrode to operate at higher speeds, in larger diameters, and at higher current values.

Safe Handling of Explosives

INSTITUTE OF MAKERS OF EXPLOSIVES, New York City, announces that: the railroads of the United States and Canada during the past year established a further safety record of no persons killed or injured and no property damaged in the transportation of dynamite and black powder. The amount of these explosives transported on the railroads was something more than 300,000,000 lb.

The annual report of the Bureau for the Safe Transportation of Explosives and Other Dangerous Articles, just published, gives these facts and also shows that 1934 was the eleventh consecutive year in which these railroads have carried dynamite and black powder without a person being injured.

This safety record is the result of an intensive campaign of education among railroad employes, manufacturers, and shippers of explosives, and of constant supervision with respect to enforcement of the regulations prescribed by the Interstate Commerce Commission through the carriers' enforcement agency, the Bureau of Explosives. Since the inception of the work in 1907 the explosives manufacturers have consistently coöperated with the efforts of the railroads to secure safety in the transportation of explosives.

Safety Goggles

AMERICAN OPTICAL CO., Southbridge, Mass., announces the new "F3100 Ful-Vue" goggle.

For the customary nose-piece, the new goggle substitutes pearl full-rocking nose-pads which distribute the slight weight of the goggle on the sides rather than on the top of the nose. Ear-pieces are of flexible cable, completely insulated, so that no metal touches the skin at any point. The goggle is fitted with the new 6-curve "Super Armorplate" lenses, capable of withstanding blows approximately twice as heavy as those which fracture standard lenses.

Better eye protection

Bottom-dump trailer or six-wheel truck body

THE INDUSTRY

New Incorporations

Barytes, Inc., Joplin, Mo. Incorporators are H. W. Robertson and George V. Farris.

Spanish Lake Quarry, Inc., St. Louis, Mo. Incorporators are E. L. Joaquin and E. E. Held, 3838 Nelson Drive.

Ransom Sand and Gravel Co., Eugene, Ore.; $5000. Incorporators are Walter M. and Ruth Ransom and Bernice Hendrickson.

National Cement and Vault Co., Inc., Portsmouth, Va.; to manufacture and deal in concrete and cement products; maximum capital $1000. Shirley P. Claud, Norfolk, Va., is president.

Continental Asphalt Co., Room 1944, 105 W. Adams St., Chicago, Ill.; to manufacture and sell asphaltic paving materials. Incorporators are J. Arthur Kealy, John J. Enright, Jr., and George Hendry.

Fort Bend Sand and Gravel Co., Inc., 119 N. Hamilton St., Houston, Texas; to develop sand, gravel and rock pits; capital stock $1000. Incorporators are M. W. Kennon, R. W. Rogers and T. L. Bauer.

Standard Silica Corp., 927 S. State St., Chicago, Ill.; to quarry and sell soil, clay, rock, coal, sand, etc.; 40,000 shares par value common. Incorporators are William C. Cook, Harry M. Nacey and Herbert E. Devereaux.

Asbestos Cement and Fiber Corp., New York, N. Y.; to deal in asbestos, mineral felt; 100 shares no par value. Incorporators are Archibald P. Hammerton, 619 W. 140th St., New York City, Dorothy Stroh and John Boyd.

The Roxemont Stucco Corp., Room 1826, 33 N. La Salle St., Chicago, Ill.; to manufacture and deal in building materials; 100 shares par value common. Incorporators are Joseph S. Vinci, David Prinee and Swan Anderson.

Imperial Blue Granite Co., Inc., Elberton, Ga.; to quarry granite and other stones, manufacture curbing and paving blocks, etc.; capital stock $50,000, divided into 500 shares of $100 par value. Incorporators are F. D. Smith, Felix Solana, H. H. Stoner and K. L. Davidson.

Personals

Arthur J. Pool is now employed by Trinity Portland Cement Co., Houston, Texas.

Phil McGovern has been named sales manager and board member of the Ohio Valley Rock Asphalt Co., Louisville, Ky.

Sidney P. Armsby has joined the Soil Conservation Service, U. S. Dept. of Agriculture, at Indiana, Penn., as associate soil conservationist.

J. H. Doney has moved from Spokane to West Seattle, Wash., to manage a new store for the United States Gypsum Co. at 4436 California Ave.

Clarence B. Randall, president of Inland Lime and Stone Co. and a vice-president of Inland Steel Co., has been elected a director of Inland Steel Co.

William J. Reardon of The Reardon Cement Co. of Cincinnati and Chicago has been appointed to the Ohio River Stream Pollution Committee of the Cincinnati Chamber of Commerce.

V. K. Newcomer, who has been manager of the Missouri Portland Cement Co. plant at Independence, Mo., for six years, has resigned. **Otto F. Schulcke** has been appointed to fill the vacancy.

A. E. Dickinson of Chicago, Ill., and Bedford, Ind., resigned as president of Indiana Limestone Corp. October 1 to become chairman of the corporation's board of directors. **L. E. Donaldson** has become general manager responsible to the board.

R. J. Elledge, former superintendent of the National Portland Cement Co. (Brazil), an International Cement Corp. subsidiary, has been appointed superintendent of the Lone Star Cement Co., Kansas, at Bonner Springs, another International subsidiary, succeeding John O'Callaghan.

Obituaries

G. S. Wortley, sales manager of The Imperial Electric Co., Akron, Ohio, for the past 22 years, died September 13.

John Trainor, president, Riverside Cement Co., Riverside, Calif., was killed October 20 by a fall from the roof of a barn on his ranch near Warner's Hot Springs.

Charles H. Lloyd, 59, Jacksonville, Fla., died October 12 of injuries received in an automobile crash several days before. He was general manager of the Florida Lime Rock Sales Corp. of Ocala, Fla., vice-president of the Georgia Lime Rock Co. of Perry, Ga., and head of several other organizations.

Albert B. Klise, 72, died at his home in Grand Rapids, Mich., September 23 after several months' illness. Mr. Klise organized the Petoskey Portland Cement Co., at Petoskey, Mich. He was also president of the Blackmer Rotary Pump Co., Grand Rapids, Mich.

Quarries

Gallatin, Mo.: Liberty township recently purchased a jaw-type 100-cu. yd. crusher from Farmers Mercantile Co.

Platte City, Mo.: A $25,000 WPA rock crushing project has been put under way for the improvement of city streets.

Coffeyville, Kan.: A county-owned stone crusher was used recently for surfacing the road leading south from the city park.

Fayette, Mo.: The Howard county court has purchased a new rock crusher of 120-cu.-yd.-a-day capacity for $3100, for WPA road work.

Seneca, Kan.: Nemaha county purchased a third rock crusher in September—a rebuilt model—for use in WPA road surfacing projects.

Fredonia, Kan.: Wilson county purchased a rock crusher late in September from Gore Machinery Co., Pittsburg, Kan., whose bid was $2250.

Marshalltown, Iowa: Machinery has been installed at the county rock quarry at LeGrand and rock crushing is under way with relief labor.

Gallipolis, Ohio: Three crushers and ten trucks are being used in rebuilding county roads, operating now on the Errit and the Dodson farms.

Hamilton, Mo.: The township board recently traded in its old rock crusher for a new one of double capacity, in anticipation of WPA work.

Pomeroy, Ohio: A stone quarry at Point Rock was opened September 25 as a WPA project. A road project in Olive township is also in progress.

Carlisle, Ky.: Contractors are working day and night, employing about 50 local men, to produce rock for the Mt. Olivet and Blue Licks highway before snow flies.

Centerville, Iowa: Members of the Appanoose County Soil Conservation Association are ordering limestone to be furnished at cost with the aid of CCC quarry laborers.

Louisiana, Mo.: About 70 men of the CCC camp in Bowling Green were recently put to work near Highway 54 to quarry limestone for use on farms in a soil improvement program.

Mantorville, Minn.: Dodge county will start a $75,000 WPA road surfacing project November 1. A rock crusher and an excavator have been purchased and placed south of Kasson.

Norman, Okla.: A $10,000 rock quarry and gravel pit project for Cleveland county has been approved by WPA. Native rock for an American Legion hut was produced early in October.

Oak Grove, Mo.: The Blue Springs quarry was opened late in September—the first WPA project in the county to get under way. Another quarry near Adair park was opened a few days later.

Ft. Scott, Kan.: Under a compromise emergency relief agreement, relief clients in Bourbon county have been put to work at three quarries to repay the county for groceries issued to them.

Washington, Iowa: Rock is being crushed at the Bailey quarry south of Washington to produce material for 6 miles of city streets. Horrabin Construction Co. of Iowa City is placing the rock.

Elgin, Minn.: Halvorson Bros. operated the Davis Quarry during October for the production of stone for road surfacing, simultaneously filling orders for agricultural limestone at $1.20 a ton, delivered.

Garnett, Kan.: Forty men are being employed indefinitely at the L. S. Lewis Sons stone crusher north of Garnett. The quarry is filling an order from the Santa Fe railroad for rock to be used as track ballast.

Bowling Green, Ky.: H. L. Johnson & Co., who have a contract for surfacing a new roadway at the Russellville road underpass, recently purchased a quarry from Paul Gerard, located near the site of construction.

Newton, N. C.: The city recently purchased a crusher from Caldwell Construction Co. and has made plans for constructing 4 miles of gravel-surfaced streets and 6 miles of new sidewalks under a WPA allotment.

California, Mo.: A local CCC camp, late in September, opened a quarry on the J. A. Winebrenner farm for the production of agricultural limestone. The county furnished the crusher. The limestone is sold at 75c a ton, delivered.

York, S. C.: The York county board of commissioners bought a portable rock crusher early in October to use in the Black Jacks section. The crusher is one made by Day Pulverizing Co., Knoxville, Tenn., and its cost was $1650.

Parkville, Mo.: The city has been granted $21,000 by WPA to extend graveling of county roads. The road commissioners are planning to either buy a new rock crusher or rebuild the present one to comply with government specifications.

Mt. Carroll, Ill.: George Getz and son have installed a new Stover rock crusher, the largest of its kind, at their quarry on Route 1. The output is now 80 to 100 tons a day. The quarrymen have not been able to keep up with the orders for crushed rock.

Kirksville, Mo.: Adair County Soil Conservation Association recently purchased a portable hammer-type stone crusher for $1615. Advance sales of agricultural limestone financed the transaction. The stone is sold to members at $1 a ton, and for government contracted acres at 75c a ton.

Fulton, Mo.: WPA recently allotted $3617 for the operation of a rock crusher to supply stone for road building near Shamrock, in both Callaway and Montgomery counties. Work of crushing rock on this project was begun in June under FERA but was stopped August 1 when FERA was discontinued.

St. Joseph, Mo.: The Buchanan county court recently purchased two jaw-type rock crushers and a road maintainer from Austin-Western Road Machinery Co. It was stated that two more crushers, of hammer mill type, would be bought soon. The crushers have a capacity of 110 cu. yd. in an 8-hour day, to conform with WPA specifications.

Plattsmouth, Neb.: Otoe county commissioners placed an order with Barton-Warner Co., Sioux City, Iowa, for a rock crusher early in October, conditional on the approval of a WPA project for 30 miles of farm-to-market roads. The crusher costs $3500. A deposit of rock suitable for use on a north-south feeder has been found on the John Hippe farm southeast of Dunbar.

Sand and Gravel

Roy More, Junction City, Kan., has opened a sand plant on the Schmedemann farm on Alida road.

Union Paving Co., Newman, Calif., has erected a gravel plant on the John Stewart ranch and is delivering gravel for the Newman-Crows Landing cutoff.

Eldred Crushed Stone Co. has started crushing gravel west of White Hall, Ill., for a 3-mile stretch of road being laid by Greene county between Roodhouse and Athensville.

Central Mississippi Gravel Co., Crystal Springs, Miss., suffered a fire at its office September 22. Records of the company were saved, but fire losses to it and adjacent offices were estimated at $30,000 to $50,000.

Fieber Gravel Co., Wabash, Ind., owned by Joseph Fieber of Brookville, was awarded a contract in September for 900 carloads of gravel. The order must be filled by January 1, for use on road construction work near Roann, Ind.

Fairview, Kan.: Brown county commissioners have opened a new bed of road gravel on the Mrs. Maude Stevers farm. The material from this pit is being used on the road running west from Highway 75 and the road from Morrill to Sabetha.

Carolina Sand and Gravel Co., Augusta, Ga., has purchased the operations established by the Columbus Sand and Gravel Co., Columbus, Ga., at Nixon, Ga., and Kathwood, S. C. Materials from these plants are being furnished for the construc-

tion of the Savannah Bluff lock and dam on the Savannah river, being built by the Arundel Corp., Baltimore, Md.

Cement

Universal Atlas Cement Co. plant, Northampton, Penn., resumed operation at partial capacity October 1.

Lime

Longview-Saginaw Lime Works, Saginaw, Ala., has revamped its hydrating plant, installing new equipment. Operations have been resumed.

Cement Products

Camp Concrete Products Co., Columbus, Ga., has built a new plant for the manufacture of concrete pipe and other products. The manufacturing unit is 60x80 ft., and there are four curing sheds 100x200 ft.

Manufacturers

The Ajax Flexible Coupling Co., Westfield, N. Y., announces the removal of its Philadelphia sales office to 1108 Otis Bldg. V. L. Sanderson is in charge.

Joseph T. Ryerson & Son, Inc., recently completed a new extensive addition to its Jersey City plant, making available an additional 45,000 sq. ft. of floor space for the stocking of steel and allied lines.

Link Belt Co., Philadelphia, Penn., announces that T. Frank Webster has been appointed resident manager of the company's Boston office, succeeding Horace Goldstein, who has been assigned to engineering sales work at Philadelphia.

The Babcock & Wilcox Co., New York, N. Y., has opened a sales office at 1809 Railway Exchange Bldg., St. Louis, Mo. F. C. Brandt has been transferred from Chicago to take charge of this office, which will serve eastern Missouri and southern Illinois.

American Foundry Equipment Co., Mishawaka, Ind., has appointed Martin R. Kidder as advertising and industrial relations director. Mr. Kidder was formerly with Link-Belt Co. During the last two years he has traveled 100,000 miles throughout North America.

The Kennedy Valve Manufacturing Co., Elmira, N. Y., announces the appointment of O. R. Lane as its representative in Oklahoma, Arkansas, Tennessee, Eastern Missouri, and Southern Illinois and Indiana, with headquarters at 455 Paul Brown Bldg., St. Louis, Mo.

Ray F. Schneider, formerly advertising manager, has been elected president of the **Williams Patent Crusher and Pulverizer Co.,** St. Louis, Mo. Except for two years spent in the army during the World War, Mr. Schneider has been with the company for the last twenty years.

Foote Bros. Gear and Machine Co., Chicago, Ill., was recently awarded a large contract covering a mitre gate and tainter valve operating machinery for three locks and dams in the Mississippi river—one located at Red Wing, Minn., another at Le Claire, Iowa, and the third at New Boston, Iowa. The company has appointed P. E. Welton of Universal Engineering Corp., Akron, Ohio, as a special representative for the rubber industry.

William M. Black

William M. Black has been elected vice-president in charge of sales of the **American Manganese Steel Co.** Mr. Black entered the employ of the company in 1912 and has served with the Pittsburgh, New York and Chicago Heights sales districts. His office is at Chicago Heights, Ill.

Electro Metallurgical Sales Corp. announces the election of John D. Swain as vice-president. Mr. Swain has been vice-president of The Linde Air Products Co. and Union Carbide Sales Co., other units of the Union Carbide and Carbon Corp. His office is at 30 E. 42nd St., New York, N. Y.

Four Wheel Drive Auto Co., Clintonville, Wis., announced recently, at a stockholders' meeting, that sales of its trucks for the first six months of this year increased 63.4% over the same period last year.

General Electric Co., Schenectady, N. Y., announces the retirement of F. P. Cox as manager of the West Lynn, Mass., works. Nelson J. Darling, manager of the River Works at Lynn, has assumed management of both plants, being aided by N. M. DuChemin, formerly superintendent of the West Lynn works, as assistant manager in charge of operations at West Lynn. W. G. Mitchell continues as assistant manager in charge of operations at the River Works.

Chain Belt Co., Milwaukee, Wis., announces the appointment of F. H. Burlew Co., 221 W. Huron St., Chicago, Ill., as exclusive distributor of Rex Construction equipment in the Chicago area. The J. D. Pittman Tractor Co., 520 N. 28th St., Birmingham, Ala., has been made its distributor in the Birmingham area; and the O. S. Stapley Co., 723 Grand Ave., Phoenix, Ariz., the distributor in Arizona. Eastern Tractor and Equipment Co., 315 Forest Ave., Portland, Maine, is its exclusive distributor in Maine. This firm has a branch office at 632 Main St., Bangor, Maine, where it also maintains parts stocks. Burford-Toothaker Tractor Co., Montgomery, Ala., is exclusive distributor of Rex Construction equipment in that territory.

Statement of the Ownership, Management, Circulation, Etc., Required by the Act of Congress of March 3, 1933,

Of Rock Products, published every month at Chicago, Illinois, for October 1, 1935.

State of Illinois, County of Cook, ss.

Before me, a notary public in and for the State and county aforesaid, personally appeared Nathan C. Rockwood, who, having been duly sworn according to law, deposes and says that he is the editor of Rock Products and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—Tradepress Publishing Corporation, 330 So. Wells St., Chicago, Ill.

Editor—Nathan C. Rockwood, 330 So. Wells St., Chicago, Ill.

Managing Editor—None.

Business Manager—L. A. Koch, 330 So. Wells St., Chicago, Ill.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Tradepress Publishing Corporation, 330 So. Wells St., Chicago, Ill.

I. H. Callender, 330 So. Wells St., Chicago, Ill.

Nathan C. Rockwood, 330 So. Wells St., Chicago, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is: (This information is required from daily publications only.)

NATHAN C. ROCKWOOD,
Editor.

Sworn to and subscribed before me this 25th day of September, 1935.

(Seal) W. H. KOCH,
Notary Public.

(My commission expires March 22, 1937.)

Classified Directory of Advertisers in this Issue of Rock Products

For alphabetical index, see page 2

This classified directory of advertisers in this issue is published as an aid to the reader. Every care is taken to make it accurate, but ROCK PRODUCTS assumes no responsibility for errors or omissions. The publishers will appreciate receiving notice of omissions or errors, or suggestions

Acetylene Welding Rod
American Steel & Wire Co.

Agitators, Thickeners and Slurry Mixers
F. L. Smidth & Co.

Air Compressors
Fuller Co.
Nordberg Mfg. Co.
Traylor Eng. & Mfg. Co.
F. L. Smidth & Co.

Air Filters
Fuller Co.

Air Separators
Bradley Pulverizer Co.
Raymond Bros. Impact Pulv. Co.
Sturtevant Mill Co.

Anti-Freeze Solution
Firestone Tire & Rubber Co.

Automatic Weighers
Richardson Scale Co.

Babbitt Metal
Joseph T. Ryerson & Son, Inc.

Backdiggers
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Backfillers
Bucyrus-Erie Co.
Harnischfeger Corp.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Bagging Machinery
Richardson Scale Co.

Ball Bearings
S K F Industries, Inc.

Balls (Grinding, See Grinding Balls)

Balls (Tube Mill, etc.)
Allis-Chalmers Mfg. Co.
F. L. Smidth & Co.

Bar Benders and Cutters
Koehring Co.

Batteries
Firestone Tire & Rubber Co.

Batchers
Fuller Company

Bearings
Chain Belt Co.
Link-Belt Co.
Joseph T. Ryerson & Son, Inc.
S K F Industries, Inc.
Timken Roller Bearing Co.

Bearings (Anti-Friction)
S K F Industries, Inc.
Timken Roller Bearing Co.

Bearings (Roller)
S K F Industries, Inc.
Timken Roller Bearing Co.

Bearings (Tapered Roller)
Timken Roller Bearing Co.

Bearings (Thrust)
S K F Industries, Inc.
Timken Roller Bearing Co.

Belting (Elevator and Conveyor)
Robins Conveying Belt Co.

Belting (V Type)
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

Belts (Fan)
Firestone Tire & Rubber Co.

Bin Gates
Chain Belt Co.
Fuller Co.
Industrial Brownhoist Corp.
Link-Belt Co.
Traylor Eng. & Mfg. Co.

Bins
Pioneer Gravel Equipt. Mfg. Co. (Steel)
Traylor Eng. & Mfg. Co.

Blasting Machines
Atlas Powder Co.

Blasting Powder (See Powder, Blasting)

Blasting Supplies
Atlas Powder Co.

Blocks (Pillow, Roller Bearing)
Link-Belt Co.
S K F Industries, Inc.
Timken Roller Bearing Co.

Boilers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Brake Linings (Asbestos)
Firestone Tire & Rubber Co.

Breakers (Primary)
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Buckets (Clamshell, Grab, Orange Peel, etc.)
Blaw-Knox Co.
Harnischfeger Corp.
Hayward Company
Industrial Brownhoist Corp.
Link-Belt Co.
Wellman Engineering Co. (G. H. Williams)

Buckets (Dragline Cableway)
Pioneer Gravel Equipt. Mfg. Co.

Buckets (Dragline and Slackline)
Bucyrus-Erie Co.
Pioneer Gravel Equipt. Mfg. Co.
Wellman Engineering Co. (G. H. Williams)

Buckets (Dredging and Excavating)
Harnischfeger Corp.

Buckets (Elevator and Conveyor)
Chain Belt Co.
Cross Engineering Co.
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Link-Belt Co.
Pioneer Gravel Equipt. Mfg. Co.

Bulldozers
Koehring Co.

Bushings (Machined or Processed)
Manganese Steel Forge Co., Inc.

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American Steel & Wire Co
Broderick & Bascom Rope Co.
General Electric Co.
Link-Belt Co.
Macwhyte Company
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Calcining Kettles (Gypsum)
J. B. Ehrsam & Sons Mfg. Co.

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Ensign-Bickford Co.

Caps (Blasting)
Atlas Powder Co.

Car Pullers
Link-Belt Co.

Castings
Babcock & Wilcox Co.
Eagle Iron Works (Grey Iron)
Link-Belt Co.
Timken Roller Bearing Co.

Cement Making Machinery
F. L. Smidth & Co.

Cement Process
Cement Process Corp.

Cement Pumps
Fuller Co.
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Chain (Dredge and Steam Shovel)
Bucyrus-Erie Co.

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Chain Belt Co.
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Broderick & Bascom Rope Co.
Macwhyte Company
Williamsport Wire Rope Co.

Coal Crushers and Rolls
Williams Patent Crusher & Pulv. Co.

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Gruendler Crusher & Pulv. Co.
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

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Concrete Slab Raising Equipment (Mud-Jack)
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Traylor Eng. & Mfg. Co.

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Fuller Company

Conveyors (Screw)
Link-Belt Co.

Conveyoweighs
Richardson Scale Co.

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Link-Belt Co.

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Cranes (Crawler and Locomotive)
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Lima Locomotive Works, Inc (Ohio Power Shovel Co.)
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Cranes (Excavator
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Cranes (Overhead Traveling Electric)
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Pennsylvania Crusher Co.

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Pennsylvania Crusher Co.
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Williams Patent Crusher & Pulv. Co.

Crushers (Jaw and Gyratory)
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Earle C. Bacon, Inc. (Jaw))
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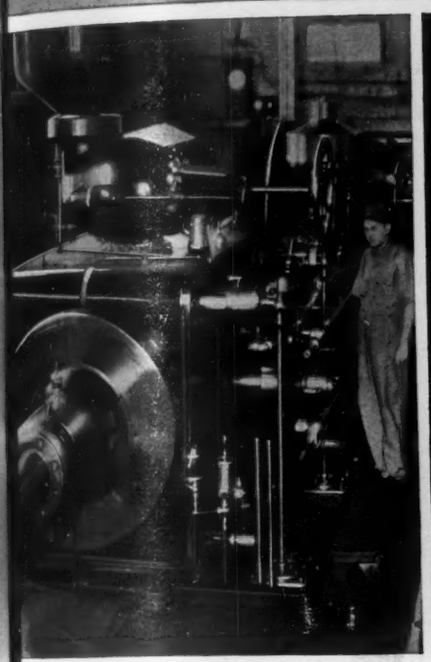

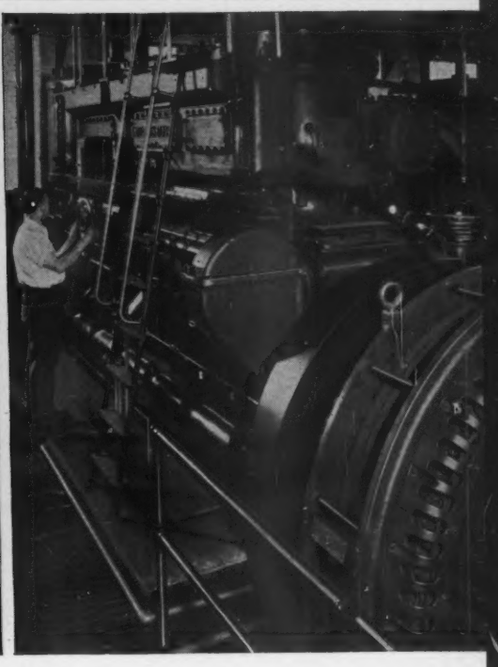

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For alphabetical index, see page 2

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Crushers (Rotary)
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Crushers (Single Roll)
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McLanahan & Stone Corp.
Pennsylvania Crusher Co.
Pioneer Gravel Equipt. Mfg. Co.

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Babcock & Wilcox Co.
Sturtevant Mill Co.
Traylor Eng. & Mfg. Co.

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Bucyrus-Erie Co.
The Frog, Switch & Mfg. Co.

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Koehring Co.

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Bucyrus-Erie Co.
Harnischfeger Corp.

Draglines
Bucyrus-Erie Co.
Harnischfeger Corp.
Link-Belt Co.

Draglines (Gasoline or Electric)
Koehring Co.

Dragline Excavators
Bucyrus-Erie Co.
Harnischfeger Corp.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Dragline Cableway Excavators
Bucyrus-Erie Co.
Link-Belt Co.
Sauerman Bros.

Dragline Excavators (Walking)
Bucyrus-Monighan Co.

Dredge Pumps (See Pumps, Dredging)

Dredges
Bucyrus-Erie Co.
Hayward Co.
Hetherington & Berner, Inc.
Morris Machine Works

Drill Bits
Timken Roller Bearing Co.

Drills
Bucyrus-Erie Co.
Timken Roller Bearing Co.

Drives (Short Center)
Allis-Chalmers Mfg. Co.

Dryers
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Bonnot Company
Combustion Engineering Corp.
Hardinge Company, Inc.
Traylor Eng. & Mfg. Co.

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Koehring Co.

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Allis-Chalmers Mfg. Co.
Blaw-Knox Co.

Dust Conveying Systems
Fuller Company

Dynamite
Atlas Powder Co.

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Hetherington & Berner, Inc.
Productive Equipment Corp.
F. L. Smidth & Co.
Sturtevant Mill Co.

Engines (Diesel)
Nordberg Mfg. Co.

Engines (Steam)
Morris Machine Works

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Excavators (Crawling Tractor)
Koehring Co.

Excavators (Dragline)
Koehring Co.

Explosives
Atlas Powder Co.

Fans
General Electric Co.

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Babcock & Wilcox Co. (Pulverized Coal)
Chain Belt Co.
Fuller Co. (Cement and Pulverized Material)
Hardinge Company, Inc.
Pioneer Gravel Equipt. Mfg. Co.
Smith Engineering Works (Plate)

Furnaces
Combustion Engineering Corp.

Fuses (Detonating and Safety)
Ensign-Bickford Co.

Fuses (Electrical)
General Electric Co.

Gasoline
Texas Company

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Chain Belt Co.
General Electric Co.
Link-Belt Co.

Gelatin and Semi-Gelatin (See Explosives)

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Hayward Co.

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Gulf Refining Co.
Texas Company

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Babcock & Wilcox Co.

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Robins Conveying Belt Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Grizzly Feeders
Traylor Eng. & Mfg. Co.

Hammer Mills (See Crushers)

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Harnischfeger Corp.
Link-Belt Co.
Pioneer Gravel Equipt. Mfg. Co.

Hose (Water, Steam, Air Drill, Pneumatic, Sand Suction and Discharge)
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Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

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General Electric Co.

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Sturtevant Mill Co.

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Allis-Chalmers Mfg. Co.
Bonnot Company
F. L. Smidth & Co.
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Raymond Bros. Impact Pulv. Co.

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Locomotives (Steam, Gas and Electric)
General Electric Co.

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General Electric Co.

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McLanahan & Stone Corp.
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Lubricants
American Steel & Wire Co. (Wire Rope)
Broderick & Bascom Rope Co. (Wire Rope)
Gulf Refining Co.
Macwhyte Company (Wire Rope
Texas Company

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Harrington & King Perforating Co.

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The Frog, Switch & Mfg. Co.

Manganese Steel Parts
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Manganese Steel (Plates and Sheets)
Manganese Steel Forge Co., Inc.

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Bonnot Company
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Williams Patent Crusher & Pulv. Co.

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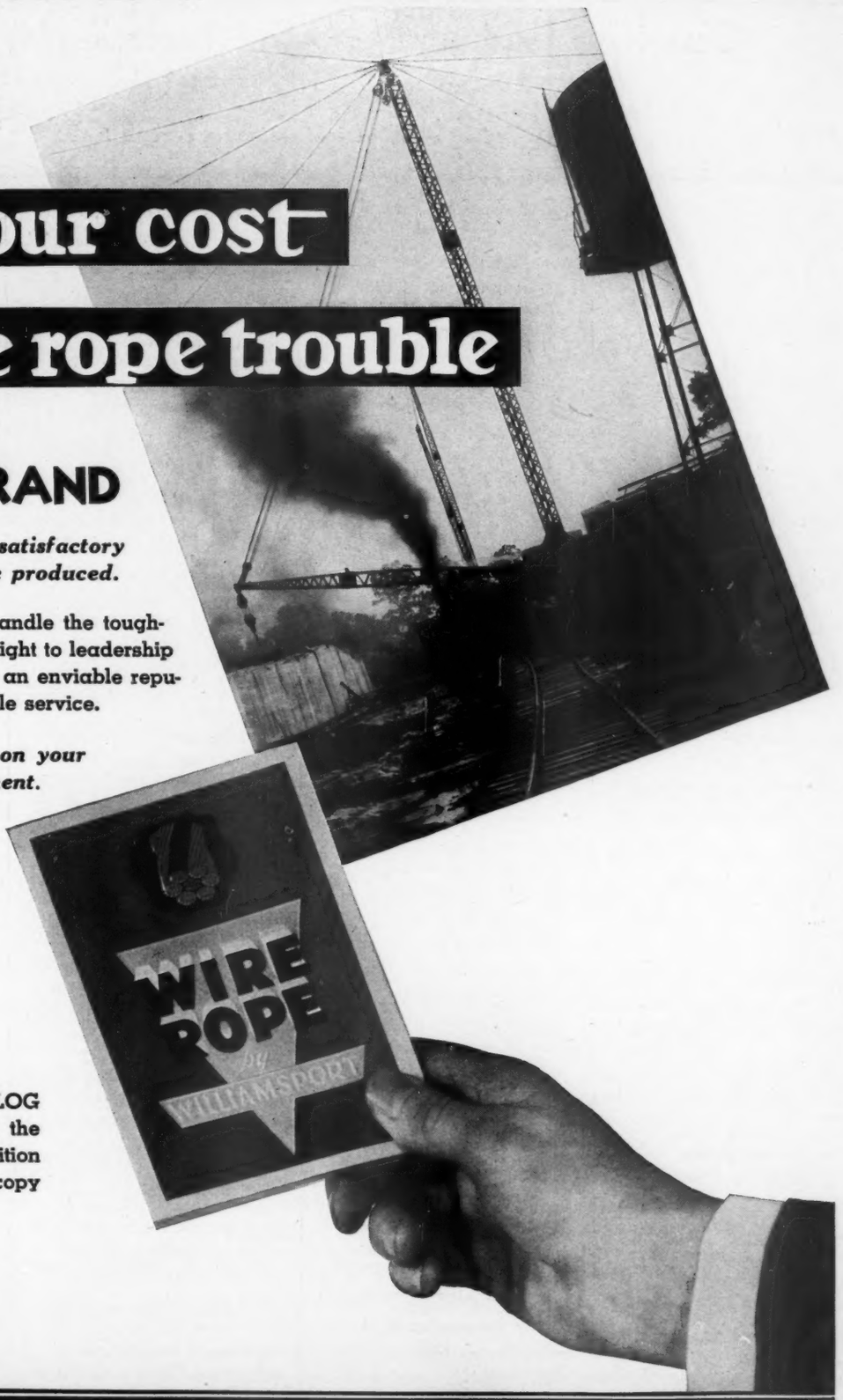

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For alphabetical index, see page 2

Oils (Lubricating)
Gulf Refining Co.
Texas Company

Paint (Asphalt)
Texas Company

Pavers (Concrete)
Koehring Co.

Perforated Metal
Chicago Perforating Co.
Cross Engineering Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.

Plates (Double Corrugated)
Hendrick Mfg. Co.

Pneumatic Drills (See Drills)

Portable Conveyors
Fuller Company
Link-Belt Co.

Portable Crushing and Screening Unit
Good Roads Machy. Corp.
Pioneer Gravel Equipt. Mfg. Co.
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Powder (Blasting)
Atlas Powder Co.

Power Transmission Equipment
Chain Belt Co.
S K F Industries, Inc.

Pulverizers (See also Crushers, Mills, etc.)
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Babcock & Wilcox Co.
Bonnot Company
Bradley Pulverizer Co.
Dixie Machy. Mfg. Co.
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Sturtevant Mill Co.
Williams Patent Crusher & Pulv. Co.

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Fuller Company

Pumps (Cement)
Fuller Company

Pumps (Cement Slurry)
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

Pumps (Centrifugal)
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
Morris Machine Works
A. R. Wilfley & Sons

Pumps (Dredging)
Bucyrus-Erie Co.
Morris Machine Works

Pumps (Pulverized Coal)
Babcock & Wilcox Co.

Pumps (Sand and Gravel)
Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
Morris Machine Works
A. R. Wilfley & Sons

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General Electric Co.

Railways (Electric)
General Electric Co.

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Blaw-Knox Co.
Chain Belt Co.

Rims (Wheel)
Firestone Tire & Rubber Co.

Road Machinery
Harnischfeger Corp.
Koehring Co.

Rock Bits (See Drill Bits)

Rock Drills (See Drills, Rock)

Rod Mills
Traylor Eng. & Mfg. Co.

Roller Bearings
S K F Industries, Inc.
Timken Roller Bearing Co.

Roofing (Ready to Lay)
Texas Company

Roofing and Siding (Steel)
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Rope, Wire (See Wire Rope)

Sand Drag
Smith Engineering Works

Sand Settling Tanks
Link-Belt Co.
Smith Engineering Works

Scales (Automatic Proportioning)
Richardson Scale Co.

Scales (Cement)
Richardson Scale Co.

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Link-Belt Co.
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Robins Conveying Belt Co.
Smith Engineering Works
Sturtevant Mill Co.
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

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Smith Engineering Works

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Smith Engineering Works

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Steel (Open Hearth)
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Steel (Special Alloy)
Timken Roller Bearing Co.

Steel (Special Analysis)
Timken Roller Bearing Co.

Stokers
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Combustion Engineering Corp.

Tanks
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Link-Belt Co.

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Track Shifters
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Macwhyte Company
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Transmission Belting (See Belting)

Transmission Machinery
Allis-Chalmers Mfg. Co.
Timken Roller Bearing Co.

Trukmixers
Blaw-Knox Co.

Tube Mills (See Mills, Ball, Tube, etc.)

Tube Mill Liners (See Mill Liners)

Tubing (Seamless Steel)
Timken Roller Bearing Co.

Underground Shovels
Nordberg Mfg. Co.

Vibrating Screens (See Screens, Vibrating)

Washers (Sand, Gravel and Stone)
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Eagle Iron Works
Link-Belt Co.
Traylor Eng. & Mfg. Co.

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John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

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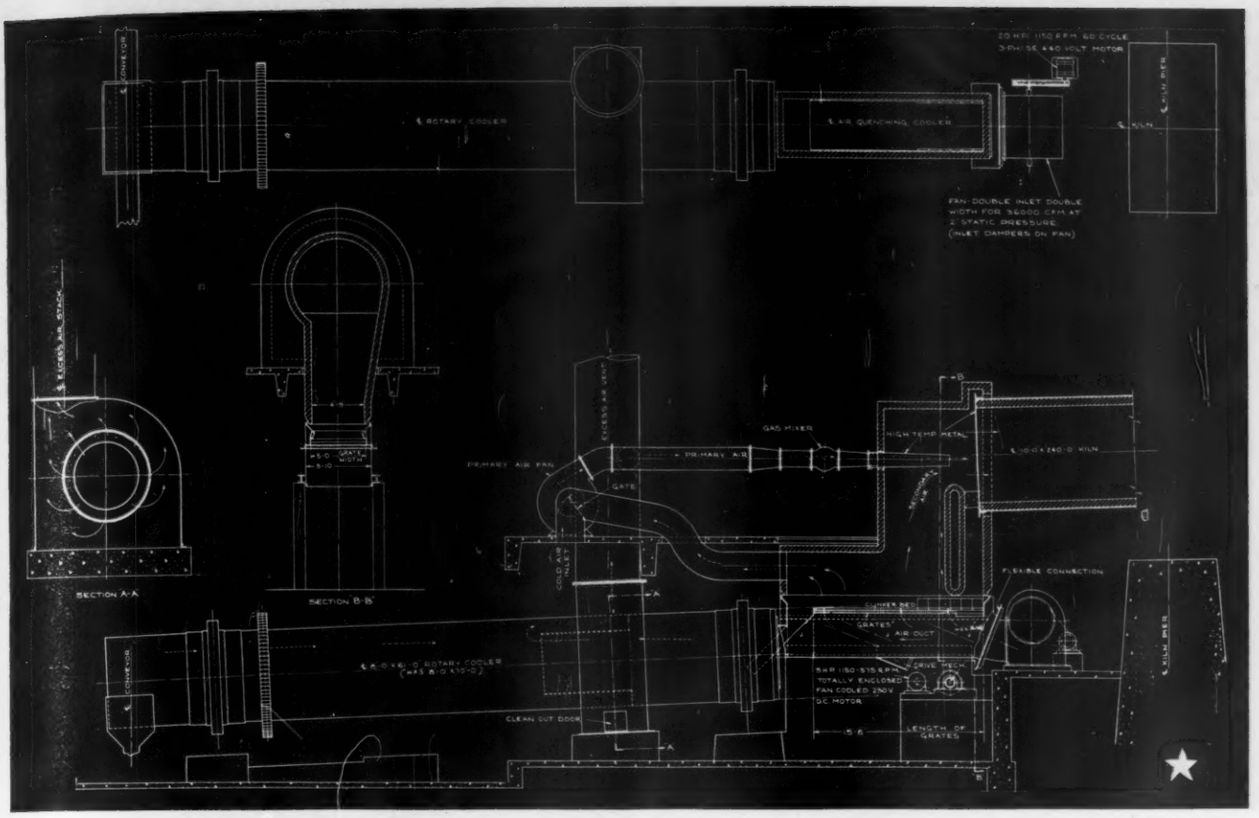
American Steel & Wire Co.
Broderick & Bascom Rope Co.
A. Leschen & Sons Rope Co.
Macwhyte Company
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Slings (See Slings, Wire Rope)

Wire Rope Sockets (See Sockets, Wire Rope)



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THE ALLIS-CHALMERS Air Quenching Clinker Cooler is designed and manufactured to suit the particular requirements of your installation and may be used independent of or in conjunction with an existing cooler. ★ It is so constructed and operated as to give a rapid air quenching effect to the clinker and at the same time utilize the greatest portion of the sensible heat of the clinker for combustion in the kiln.

Capacities in finish grinding mills have been decidedly increased. The cement made by this process has shown improved high early strength.

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★ A short air quenching cooler installed in connection with an existing rotary cooler is illustrated in the above diagram. Air quenching the clinker and recuperation of sensible heat is accomplished in a short air quenching cooler. The remainder of the cooling to a temperature at which the clinker may be delivered directly to the finish grinding mills is obtained in the rotary cooler. The feed end section of the rotary cooler up to the first tire is removed to make room for the installation of the short air quenching cooler.

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ROCK PRODUCTS ANNUAL PICTORIAL REVIEW NUMBER

JANUARY, 1936

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2. Additions or Improvements to Existing Plants Made in 1935.
3. New Ways or Methods of Processing Developed in 1935.
4. New Machinery Installations in 1935.
5. Officers Elected or Promoted in 1935.

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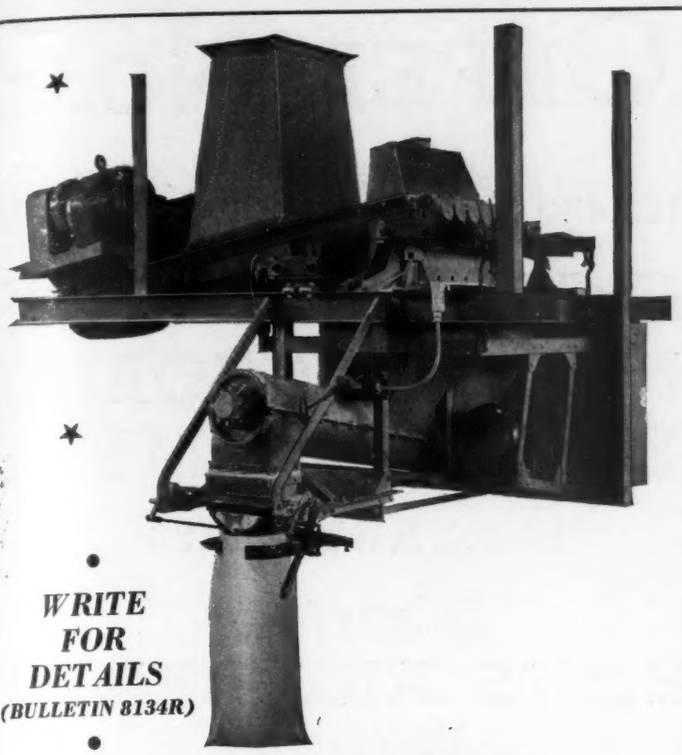
Send all photographs to the Editor of Rock Products **with** a letter telling what they illustrate, and mark them "Rock Products Pictorial Review Contest."

Rock Products

330 SO. WELLS STREET
CHICAGO, ILLINOIS



WRITE FOR DETAILS (BULLETIN 8134R)

RICHARDSON SCALE COMPANY
Clifton, New Jersey

New York Minneapolis Chicago Omaha Los Angeles Boston
Syracuse Atlanta Philadelphia Wichita Cleveland
Agents for Eastern Canada: Messrs. Peacock Brothers, Ltd., Montreal

RICHARDSON

NEW "*Multiple Screw Feed*" Automatic Scale

Here is another time-saving, profit-building innovation in automatic scales for any pulverized materials—bagging or bulk. It is speedy—saves labor and material—entirely dustproof—self-feeds and weighs automatically. It is especially adapted for dry, sluggish or lively ground materials that ordinary machines won't handle.

It is enclosed and dustless—machine deaerates the material as it feeds, and feeds and weighs without dust. It is accurate, despite any variation in the feed supply. Requires small head room. Available for bulk weighing or open mouth bagging or both. It is durable. Upkeep cost is low. It is the scale that increases your profits.

It is ideal for weighing direct from bins. There are five feeder screws, three of which are faster than the other two. The three furnish the "full flow" and deliver the major part of the weighing and stop. The other two supply the "dribble" or reduced flow necessary to complete the loads.

AMERICAN *ROLLING RING* CRUSHER

Front View Showing Breaker Plate Adjustment

LOW FIRST COST makes the American Crusher a prime investment. Easy to install, dismantle and move.

LOWER OPERATING COST because the American takes less power per ton of product. Flexible rotor assures protection from injury of tramp iron.

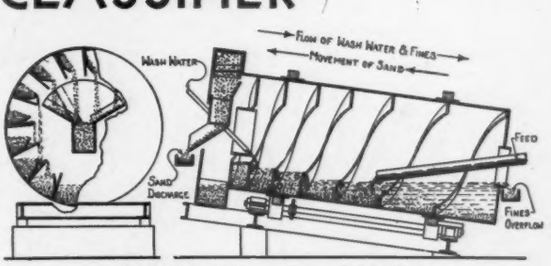
LOWER MAINTENANCE COST as the Rolling Rings wear many times longer than hammer surfaces.

Write today for facts on why the American Rolling Ring Crusher gives a more uniform product, with minimum fines and no slivers or chips.

AMERICAN PULVERIZER COMPANY
1245 Macklind Ave. St. Louis, Mo.

HARDINGE

WASHER
SEPARATOR
DISSOLVER
CLASSIFIER
} All in One Machine



Principle of Operation of Machine

The Hardinge Counter-Current Classifier—using no internal moving parts—is the only machine that can accomplish the above results.

It turns over the entire load from 3 to 5 times per revolution, freeing all particles and washing—or dissolving them, with fresh solution flowing counter to the movement of the solids.

Washed, dissolved or classified solids are kept apart from partially treated solids by virtue of the "dam" effect of the spiral attached to and revolving with the drum as one unit. What is your problem?

Write for Bulletin No. 39.

HARDINGE COMPANY
INCORPORATED
York, Pa.—Main Office & Works Chicago—205 W Wacker Drive
New York—122 E. 42nd St. San Francisco—444 Market St.

PRIZE OFFER No. 2

Open to Superintendents and Plant Operating Men

ROCK PRODUCTS ANNUAL PICTORIAL REVIEW NUMBER

JANUARY, 1936

Wanted
"HINTS AND HELPS" *Articles*

■ The Editor of Rock Products will pay five cash prizes of $50, $40, $30, $20 and $10 for the best, second, third, fourth and fifth best brief articles on how ingenious superintendents or operating men have solved a plant problem, or operating problem, during 1935.

■ Write your story in pencil or ink or on a typewriter; illustrate it with photographs, blue print or pencil sketch.

■ Send it to the Editor of Rock Products before December 16, marked "Rock Products Hints and Helps Contest Entry."

ALL ARTICLES USED WILL BE PAID FOR...

Any article submitted and found suitable for publication will be paid for at space rates of $5 per column of Rock Products, including illustrations.

This offer is open to all operating men in the industry, whether subscribers to Rock Products or not.

Rock Products

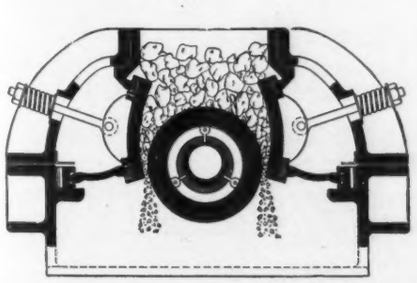
330 SO. WELLS STREET
CHICAGO, ILLINOIS

Two Blows or One

Even in prize fights—the faster man delivers two blows to one by his opponent and wins. The blows are perfectly timed to deliver their crushing effect. The BONNOT CRUSHER also delivers two blows instead of one and the superiority of this feature is apparent in results attained. The BONNOT CRUSHER delivers 750 blows per minute—thus knocking out wasted effort while delivering quality material at high speed.

Our bulletin No. 150 shows how material is made in one pass, as compared with slabby material produced by less efficient crushers.

Ask for this bulletin today—read what prominent operators have to say about the BONNOT Reduction Crusher.



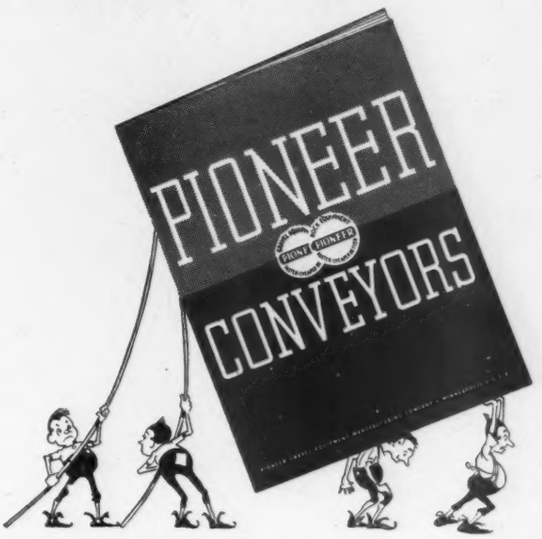
Not a roll crusher. Featuring slow creep mantle for distribution of wear

Manufactured under U. S. Patent No. 1946763

THE BONNOT CO.
CANTON, OHIO
— SINCE 1891 —

New York Office: 59 Church Street

A NEW BOOK



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Where Shall We Send It?

FACTS AND FIGURES

How to select the proper conveyor.
How to determine
the correct belt speed—
the best width and capacity—
the angle of incline—
the power required.

Also the advantages of
Standardized sectional steel frame conveyors—
Lattice frame conveyors—
Conveyor Units—
Anti-friction or plain bearings—
Accessories to increase efficiency—
Portable conveyors.

It's written for you—to assist you in laying out your Conveyor Installations

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NEAR YOU

SEND THE COUPON TODAY

PIONEER GRAVEL EQUIPMENT MFG. CO.
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Without obligation, please send a copy of your new book on "PIONEER CONVEYORS"

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Firm.....
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It Costs Less for Fine Grinding with Williams Roller Mills

Instantly changeable from 70% 100 mesh to 99.9% 325 mesh.

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Stronger Construction — Steel Castings at important points—Boiler Plate Separator Top.

Dries and Grinds Simultaneously.

If you have a job of fine grinding, limestone, lime, clay, coal, talc, gypsum or any other non-metallic mineral get the facts on the Williams Improved Roller Mill with Super-Separator. Repeat orders from some of America's biggest firms testify to its superiority. Built in six popular sizes. Write for descriptive matter.

Williams Patent Crusher & Pulverizer Co.
800 St. Louis Ave., St. Louis, Mo.

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37 W. Van Buren St.	15 Park Row	326 Rialto Bldg.

OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD
Williams
REG. U.S. PAT. OFF. PATENT CRUSHERS · GRINDERS SHREDDERS

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ALL materials, fine or coarse, light or heavy . . . clay, gravel, sand, ores, stone, etc. . . . yield to the wizardry of the mechanically-vibrated, Link-Belt Vibrating Screen, and classify themselves in strict accordance with their size. Its uniform vibration keeps the meshes open, and makes the screen's entire screening surface 100% effective. Send for Book No. 1462.

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Offices in Principal Cities

DeWITT OPERATED HOTELS

featuring—
Unusually Comfortable Rooms, Good Food, Carefully Prepared, and Rates from $2.50 Single

In Cleveland it's
The HOLLENDEN
RADIO IN EVERY ROOM

In Columbus it's
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RADIO IN EVERY ROOM

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Used Equipment for Sale

GOOD USED EQUIPMENT

SELECTED SPECIAL ITEMS

4—Symons Cone Crushers, 2', 3', 5½', 7'.
2—36"x54", 48"x72" Buchanan Jaw Crushers, all steel, type C.
1—24"x36" Worthington Jaw Crusher.
2—20" Superior McCully Gyratory Crushers.
1—No. 1260 Jeffrey Bakstad Jaw Crusher, 12"x30" feed, 12"x60" dis., to ½".
1—42" Merrick Conveyor Weighttometer.
1—12' Gayco Air Classifier, type No. 21.
1—8'8"x85' Ruggles-Coles class A Rotary Dryer; also 5'x26' rebuilt at our shops.
2—6'x35' Louisville Hot Air Rotary Dryers.
2—6'x45' Rotary Dryers, Monel Lined.
2—6'6"x60' Vulcan Rotary Kilns.
1—3 roll Raymond High Side Mill.
2—4 roll Raymond Low Side Mills.
5—Raymond Pulverizers, Nos. 0000, 00, 1, 3.
6—Hardinge Ball Mills, 4½'x16", 6'x22", 6'x36", 7'x36".
1—10' Clyde Lime Hydrator.
1—24"x72" Magnetic Pulley with M.G. set.
3—5'x22' A-C Gates iron lined Tube Mills.
1—3'x12' Hendy Tube Mill, iron lined.
2—4'x10'-5'x10' Rod Mills.
3—8'x8' Oliver Rotary Vacuum Filters.
1—36"x36" Gruendler heavy duty Hammer Mill, roller bearings, No. 4XC.
1—24" Mikro Pulverizer, d.c. 40 H.P. A.C. Motor.
1—7"x24" Sturtevant Jaw Crusher, to ½".
2—20"x14", 36"x16" Sturtevant Crushing Rolls.
1—30 ton Plymouth Gas. Locomotive, New 1929.
7—3'x5', 4'x5', 4'x7' Tyler Hummer Screens.
1—3'x6' Huron Vib. Screen, two deck.

SEND FOR BULLETIN OF

our regular stock of Crushers; Vibrating Screens; Ball, Rod and Tube Mills; Air Compressors; Rotary Kilns and Dryers; Hardinge Ball and Pebble Mills; Raymond and other Pulverizers; Air Classifiers; Thickeners; Wet Classifiers; Filter Presses; Continuous Filters, etc.

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GEORGE HAISS MFG. CO., Inc. **HAISS** **Park Ave. & 143rd St. New York**

Send me full details and prices on equipment checked:

FACTORY REBUILT CLAM SHELL BUCKETS

☐ 1—Haiss Rehandling 1½-yd. bucket
☐ 1—Blaw-Knox ¾-yd. Dreadnaught Bucket
☐ 1—Owen 2½-yd. Type "S" Bucket
☐ 1—Owen 1-yd. Type "D" Digging Bucket
☐ 1—Haiss 1-yd. Contractor Type Bucket
☐ 1—Hayward ½-yd. Class "E" Bucket
☐ 1—Williams ½-yd. Lever Arm Bucket
☐ 1—Hayward 1¼-yd. Type "E" Bucket

Factory Rebuilt Truck Loader & Belt Conveyor

☐ 1—Haiss 2-yd. a min. Creeper Truck Loader
☐ 1—Haiss 1¼-yd. a min. Creeper Truck Loader
☐ 1—Haiss 25 ft. 20 in. Trough Conveyor, Gas-Elec.

Name .....
Address .....

2-yd. Marion 480 Shovel-Crane.
1¼-yd. Byers Shovel-Crane.
1-yd. Koehring Crane.
¾-yd. P. & H. Shovel-Crane.
½-yd. Byers Shovel-Crane.
½-yd. Thew-Universal Crane.
48 Steel Stone Skips 3 and 4 yd.
Compressors: 1300, 1245, 1190, 310, 265, 250, 110 ft.
Draglines and Slacklines, ½, 2 and 3 yd.
Crushers: Telsmith 13A, 40.
Electric Hoists 10, 30, 60, 80, 125 HP.
Derricks—All steel:
3 Guy 15 ton 115 mast, 100 ft. boom.
2 Stiff-leg 10 and 15 ton, 90 ft. boom.
Drill sharpener, furnace and grinder.
Orange Peel and Clamshells: 2, 1½, 1¼, 1, ¾ yd.
Pumps: 1,000 to 5,000 gal.
3—12 ton 36" gauge gas locomotives.

J. T. WALSH

500 Brisbane Bldg. Buffalo, N. Y.

FOR SALE

12—5-yd. 36" ga. Western Dump Cars.
6—2-yd. 36" ga. Koppel Steel V Dump Cars.
4—1½-yd. 36" ga. Insley Steel V Dump Cars.
2—3½-ton 36" ga. Whitcomb Gasoline Locomotives.
1—9x10 Sturtevant Vertical Steam Engine.
1—10x10x12 Ingersoll Steam-Driven Air Compressor.
1—9x10 Lidgerwood 3-Drum Steam Hoist.
1—8¼x8 Lidgerwood S.D. Steam Hoist.
22—12-yd. Western std. ga. Air or Hand Dump Cars.
2—40-ton Baldwin S.T. Locomotives, 14x22 cyls.
Rails—First-Class Relay Rails and Bars, 60, 70, 80, 85, 90 and 100 lb. Rails, Tie Plates, etc.

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No. 4 Bonnot 4 x 22 Tube Mill.
Traylor 6 x 8 Tube Mill.
400 K. W. Busch Sulzer Diesel Unit.
100 H.P. Worthington Diesel Elec. Unit.
750-yd. and 1,250-yd. Asphalt Plants.
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6-ton and 7½-ton Universal Truck Cranes.
110-ft., 220-ft. and 320-ft. Compressors.

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125 Western 4-yard. 36" gauge, heavy-duty.
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4—21-ton Vulcan 4-wheel saddle tanks, 36" gauge.
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1—50-ton Industrial 8-wheel, 50' boom.
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Only $3,000.00!

A. M. S. 12" Sand and Gravel Pump in excellent condition. 250 H.P. direct connected motor for 3-phase, 440-volt, 60 cycles. Has grid box, controller, pipe sleeves, valves and fittings.

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Jaw Crushers—2"x4" up to 66"x84".
Crushing Rolls—12"x12" up to 54"x64"—Gyratory Crushers.
Ring Roll Mills — No. 0 and No. 1 — Swing Hammer Mills.
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Complete drying and asphalt mixing plants.

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(Classified Advertising Continued on Next Page)

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AIR COMPRESSORS
Portable and stationary, belt, with elec. or gas. power, sizes from 21 cu. ft. to 1,000 cu. ft.

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246—Buckets, all sizes and makes.

CARS
Large lot including std. ga. 6 and 12-yd. and 20-yd., 36-ga. 5-yd. and 24-ga. 1½-yd. Also std. ga. flat cars and ballast cars.
48—Koppel Quarry cars 42" ga. 2½-yd. One way side dump.

CONVEYORS and ELEVATORS
9—Port Belt Conveyors with steel frame, gas. or elec. pr. 18 and 24 in. Barber-Greene and Chic. Automatic.
1—Stationary: Barber-Greene 18"x 100'.
11—Bucket elevators: 6 Chain Belt Co. and Weller and Link Belt vertical enclosed type; capacities from 35 to 117 tons per hour.
5—Weller inclined type Nos. 3, 4, 5 and 6 up to 170 yds. per hr.

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Gasoline, electric and steam. All sizes.

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1—Northwest Model 104 No. 1427, 45-ft. boom, 1½-yd. bucket.
2—Osgood Nos. 2054, 2069 with 40-ft. boom, 1 with 1-yd. shovel front.
1—Brownhoist No. 2 No. 9964, 40-ft. boom, 1-yd. bucket.
1—Link-Belt K-1 No. 1024, 50-ft. boom, 1-yd. bucket.
1—Industrial Brownhoist type CC, No. 5071, 36-ft. boom, ½-yd. bucket.

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1—Symons No. 5½ coarse cone, No. 521.
2—No. 3 McCully gyratory crusher.
1—Set Power and Mining size 42 in. x 16 in. smooth crushing rolls.
1—No. 6 Champion 12 ft. x 26 in. jaw crusher No. U-1075-4.

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Steel and wood, stiff leg, or guy; from 5 to 50 tons, including 3 steel stiff legs; 1—20-ton Terry 100 ft. boom; 1—10-ton Insley 80 ft. boom and 1—10-ton American, 80 ft. boom.

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All sizes and types, both force, centrifugal and steam.

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3—Allis Chalmers roller type heavy duty 2—48 in. x 18 ft.; 1—51 in. x 21 ft.
1—Stephens Adamson 3 ft. x 6 ft. double deck suspension type vibrating screen.

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60 HP Amer. 3D & Swinger Gas Hoist.
800/1000' Sullivan Elec. & Diesel Comp.
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Crushers, Motors, Generators, Rail, Pipe, Cars, Locomotives, Cranes, Buckets.

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Leahy 3-deck 3'x6' Vibrating Screen.
Mitchell Electric 3'x8' Vibrating Screen.
Robins Perfex 52"x7' Vibrating Screen.
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Chain-Bucket Elevators, 24' to 45' high.
Jeffrey No. 3 Limepulver Crusher and Hammermill.
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FOR SALE—1 complete 10" Dredge Boat equipped with 40-foot Eagle Swintex Ladder and Amsco Heavy-Duty Pump.

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12-Yd. Western Air, also Hand Dump Cars, Flats, Gondolas, Steel Hopper Cars, Box Cars, Locomotives.
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Used diamond and churn drills, steam pumps, at 40% of manufacturers' prices. Drill rods, flush joint casing and miscellaneous drill supplies at very low prices.
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Motors and Generators, A.C. and D.C., for sale at attractive prices. New and Rebuilt. All fully guaranteed. Write for List and Prices.
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1—½ yd. Slackline with 2 speed gasoline hoist.
1—¾ yd. Slackline with 2 speed Thomas hoist.
1—1½ yd. Drag Scraper outfit either gasoline or electric power.
1—2 yd. Drag Scraper outfit, either power.
Most all sizes of used buckets, hoists, wire rope, etc.
"Everything in slackline and drag scraper outfits"
S. O. NAFZIGER, 53 W. Jackson Blvd., Chicago

TWO Buchanan 18 x 36 Jaw Crushers. 100 H.P. and 60 H.P. Westinghouse Motors for same. Cash or terms. Inspection invited. Also Cranes, Shovels, Clam Shell Buckets, Compressors, Pumps, etc.
RENTAL SERVICE CO., INC.
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24" Symons Disc Crusher, 12"x24" Champion Jaw Crusher, Barber Green 20' center by 20" belt conveyor, Fairbanks-Morse 6" Centrifugal Electric Pump. Equipment in excellent condition and priced to sell immediately.
MARIBEL GRAVEL CO., Maribel, Wis.

A GOOD BUY
1—5-roll High Side Raymond Pulverizer, including Cyclone and Blower. Complete except motors.
HAWKEYE FUEL COMPANY
740 N. Division St. — Spokane, Wash.

FOR SALE
22'x5' Bonnot Tube Mill complete.
2—35'x5'9" direct-heat dryers with furnaces and stacks.
No. 1½ Sturtevant fine crusher.
Nos. 3, 7 and 8 Gyratory crushers.
Conveyors, cars and draglines.
Robt. A. Boothe Equipment Co., Sheffield, Ala.

For Sale—A Good Time to Buy
4 draglines, Diesel, Bucyrus, 50B-60'B
2 draglines, Diesel, P&H 700-775-50'B
Ingersoll 34 Drill Sharpener, complete.
Ingersoll 600 ft. full Diesel compressor.
Dragline bucket, 2½-yd. heavy duty Mang.
A. V. KONSBERG
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½-yard Shovel, good condition. Give full particulars as to model, weight, age, location and price. Address
Peyton Hunt Company, Inc.
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Take advantage of the Opportunity offered in the Used Equipment Department to dispose of the equipment that you no longer need.

POSITIONS VACANT

POSITION OPEN
Superintendent familiar with production and processing or fabricating **rock wool** for the general market. State experience and salary expected.
Address Box 694, care of ROCK PRODUCTS
330 South Wells Street, Chicago, Ill.

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CONSULTING ENGINEER
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Specializing in Gypsum Plants and in the Mining, Quarrying and Manufacture of Gypsum Products.
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Examinations — Construction
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WE LOOK INTO THE EARTH
By using Diamond Core Drills. We drill for Limestone, Gypsum, Talc, Fire Clay, Coal and all other minerals.
PENNSYLVANIA DRILLING CO.
Drilling Contractors
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Dealer in PHOSPHATE LANDS and all grades of rock.
10-mesh PHOSPHATE FILLER, $3.00 net ton
40 years' experience TENNESSEE PHOSPHATE FIELD. Correspondence solicited. Can find what you want if it can be found.
305 West Seventh St., Columbia, Tennessee

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ENGINEER OFFERS SHORT TIME CONsulting service on gravel-pit and quarry reports—geology, plant design, and in particular, the commercial value of plant for any given location. Wide general experience and a very special experience in plant design for difficult cleaning and recovery operations. Roy Reddle, Consulting Engineer, Knoxville, Tennessee.

POSITION WANTED AS SUPT. WITH A progressive stone company; 20 years' experience operating limestone quarries and crushing plants; familiar with all modern equipment, efficient handling of labor and low cost of production; qualified to assume full charge of any size plant; unquestionable reference. Address Box 654, care of Rock Products, 330 South Wells St., Chicago, Ill.

POSITION WANTED BY CHEMIST WITH 15 years' experience as Superintendent and Chief Chemist of cement plants. Capable of handling plant labor and all departments efficiently. Will accept position in either capacity. Excellent reference. Address Box 693, care of Rock Products, 330 South Wells St., Chicago, Ill.

A LICENSED DRILLER AND BLASTER with years of experience in the burning of lime, building and cut stone desires a permanent connection with a progressive stone company. Any location. Excellent references. Address Box No. 695, care of Rock Products, 330 South Wells St., Chicago, Ill.

Steels are withdrawn easily

WHEN TIMKEN BITS ARE USED

TIMKEN BITS can be withdrawn easily and quickly in any kind of ground because of the smooth contour where bit and steel meet. There are no obstructions to catch the chips or muck behind the bit and thus wedge the steel in the hole.

Every mine superintendent and driller will realize and appreciate the value of this feature, for there is no object in gaining time in drilling holes and then losing it again in withdrawing steels.

Timken Bits offer you a complete cycle of savings as follows: (1) elimination of reforging; (2) elimination of tramming and nipping; (3) faster drilling; (4) more footage per bit; (5) easy withdrawal of steel from holes; (6) steel investment greatly reduced.

More and more mine and quarry operators are swinging to Timken Bits. It will pay you to try them on your job. Write for further information.

Complete Stocks Maintained in Principal Distributing Centers

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

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